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REMEMBER THE NAME

FORT WAYNE

AND

ALWAYS ASSOCIATE IT WITH

SUPREMACY

IN THINGS ELECTRICAL

Where to Buy It in the West, Pages 9, 10, 12. Alphabetical Index to Advertisers, Page 8.

Central Station Storage Batteries

Central Station	No. of Batteries	Ampere Capacity
New York Edison Company	49	308,660
Commonwealth Edison Co., Chicago	28	166,304
Edison Elec. Ill. Co., Brooklyn	13	67,214
Edison Elec. Ill. Co., Boston	9	48,350
Philadelphia Electric Co.	4	15,180
Consolidated Gas, Elec. Lt. & Pr. Co., Baltimore	1	22,000
Minneapolis General Electric Co.	3	20,630
Union El. Lt. & Pwr. Co., St. Louis	4	18,864
Rochester Ry. & Lt. Co.	2	19,550
Kansas City El. Lt. Co.	2	14,984
Cleveland Electric Ill. Co.	3	14,000
Edison Electric Ill. Co. Detroit	5	24,760
Potomac Elec. Pwr. Co., Washington, D. C.	3	12,160

This Company has manufactured and installed (or has under contract) a total of

196 Batteries in 64 Cities for Central Station Service

The Central Station Batteries manufactured and installed by this Company, now in service or under contract have a

Total Capacity of 1,062,616 Amps. at Emergency Rate

THE ELECTRIC STORAGE BATTERY CO.

1888 PHILADELPHIA, PA. 1912

Sales Offices

New York Chicago St. Louis Cleveland
Boston Detroit Atlanta Denver Toronto

Pacific Coast Selling Agency

PIERSON, ROEDING & COMPANY
San Francisco Los Angeles Portland Seattle

Safety Paper-Insulated Cable

ANOTHER SAFETY STANDARD

For Central Station Power Distribution

Careful selection of the materials used in the manufacture of our paper and lead cables, coupled with experienced engineering skill and thorough workmanship, must produce the most efficient product.

We developed and patented an insulating oil, which thoroughly impregnates the manila rope paper without decay or oxidization, and is equally absorbed by every layer — insuring equal breakdown strength on the inner layers as well as the outer.

We carry large stocks of single and duplex paper and lead cable for secondary and primary voltages in San Francisco for immediate delivery and solicit your inquiries on any underground cable installations, large or small.

Cable Terminals and Potheads — Compound and Tape.

LET US ESTIMATE YOUR UNDERGROUND EXTENSIONS

The Safety Insulated Wire and Cable Co.

RALPH L. PHELPS, MGR.

Pacific Coast Dept., 589-591 Howard St.

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SEAMLESS RUBBER SAFETY INSULATIONS

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JOURNAL OF ELECTRICITY
POWER AND GAS
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VOLUME XXVIII SAN FRANCISCO, JUNE 22, 1912 NUMBER 25

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PHOTOGRAPHY IN ENGINEERING WORK

BY M. R. LOTT.

The art of photography has within the last few years assumed an important part in an engineer's work, its value lying in the conveniences offered around the office as well as the means which it furnishes for a correct representation of matters in the field.

4. To illustrate reports on tests.
5. To show drawings in a reduced size.

The first four uses named deal with photography outside the office and for this work an Eastman 3-A kodak or a 5x7 Century camera will be found satis-

A Striking Illustration of the Incorrect and Correct Process of Photographic Printing.

A brief statement of the ways in which an engineer may advantageously use photography is made as follows:

1. To illustrate a report on the preliminary investigations of a new project.
2. To form a record of the progress made on construction work.
3. To give a true representation of completed structures.

factory. The 3-A kodak is particularly adapted for ordinary purposes, for rough country trips, or times when it is essential to carry a light equipment. By its use satisfactory results may be obtained and the size of picture secured (3¼ in. x 5½ in.) is usually sufficient. When a larger sized picture is required and weight is not an inconvenience, the 5x7 Century camera using glass plates can be advantageously used, as the plates yield better negatives than film packs.

The photographs, reproduction of tracings and drawings is one of the greatest conveniences to the engineer, for it enables him to have a number of working drawings in a compact space yet of a size sufficient to have all the characters distinctly legible, provided the drawings and tracings are prepared in a proper manner. For the reproduction of a working drawing the best results can be obtained by photographing the tracing of the drawing using transmitted light, though good results can be obtained by photographing the drawing itself, using reflected light. The secret of properly preparing the drawing lies in the use of plenty of ink, making the lines and characters heavy, more so than an ordinary person would consider necessary.

The photographing of drawings and the handling of the work done in the field comes under office supervision and it is the purpose of this article to describe the arrangement, equipment and methods adaptable for carrying out this line of work in a convenient and efficient manner and according to ways tried and proved to be satisfactory in a large engineering office.

Details of Arrangement and Equipment.

Three rooms are essential for carrying on the work, a studio and two dark rooms, one for developing and one for printing and enlarging, the arrangement shown in Fig. 1 being a convenient one. The studio and the printing room should be on the north side of the building, unobstructed as to view, the light coming in through a north window, for with this location the intensity is more even than that which comes from any other direction. In the arrangement, as shown, all three rooms should be readily accessible to each other, the developing room being separate from the printing room, thereby enabling two people to carry on these operations at the same time without interference. The little ante-room separating the two dark rooms and opening into the studio greatly improves the light proof qualities of the two dark rooms.

Ventilation is necessary and to secure this, a small ventilating fan may be used with good results, the air being drawn from the upper portion of the rooms, passages being provided for the incoming air through the window of the printing room and at the bottom of the doors by boring holes through the wooden frame-work. These holes should be covered with galvanized iron hoods, painted a dull black, and so placed that they clear the floor by about half an inch. The hoods afford protection from the light which might tend to come in.

The Studio.

In Fig. 1 the main dimensions of the studio are given as being 15 ft. x 20 ft., which size is sufficient to carry on the work to be done in this room. A closet for storing supplies is a feature not to be overlooked.

A large window 6 ft. wide by 4 ft. 6 in. high on the north side of the room provides illumination. It is arranged to accommodate the tracings to be photographed. For this purpose, the light coming through should be diffused, diffusion being accomplished by the use of the transparent tracing cloth, Excelsior brand being found satisfactory. The tracing cloth is tightly stretched and fastened to a wooden frame fitting snugly into the frame work of the window. A convenient way for holding tracings while they are being photographed is to use clips held by coiled

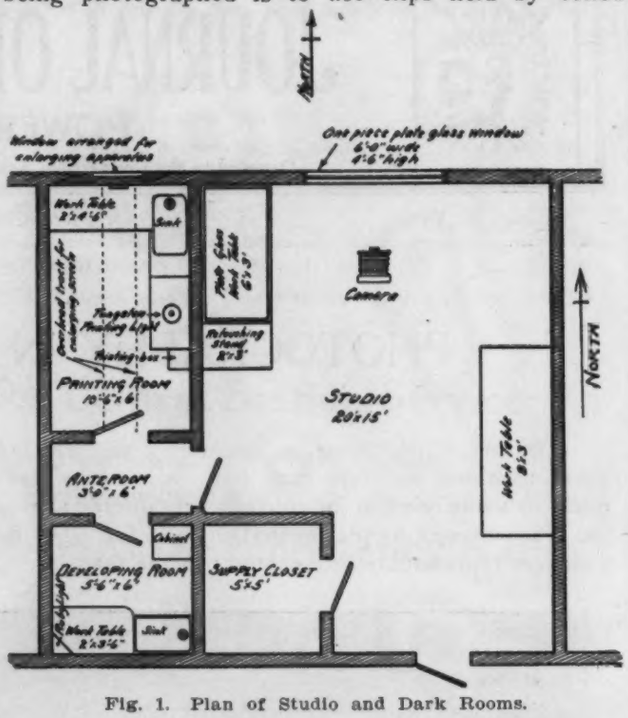


Fig. 1. Plan of Studio and Dark Rooms.

springs and small brass chains which fasten to hooks arranged at intervals on the frame work. This arrangement permits of easy adjustment and holds the tracing smoothly and securely.

When photographs of drawings are to be taken by reflected light, a skylight greatly aids the illumination, but if one is not available, good results may be obtained by fastening the drawing with thumb tacks to a screen made of "Compo-board." The screen should be mounted on a frame work capable of being easily moved around the room. Illumination of the drawing may be helped out by means of lamps arranged similarly to those used in lighting display windows, the light being thrown upon the drawing and at the same time concealed from the camera.

The walls of the studio should be finished in white to improve the general illumination.

The camera used may be of the studio type and should be provided with a lens suitable for copying work. A "Goerz Dagor" F:7.7 Focus 14 in. has been found to give excellent results. For easy manipulation the camera should be mounted on a studio stand.

The studio should be equipped with two work tables about 8 ft. x 3 ft. in size, and it will be found convenient to have one of these provided with a plate glass top. A retouching stand may be placed at the south end of the table with the plate glass top. An idea for the construction of a retouching stand may be gained from Fig. 2. It consists of a plate glass working surface mounted at an angle of 45 degrees with the horizontal, behind which an incandescent lamp is arranged to furnish the desired illumination. The plate glass should be backed with a tracing cloth for diffusing the light and should it be desired to limit the size of working space, that portion of the plate

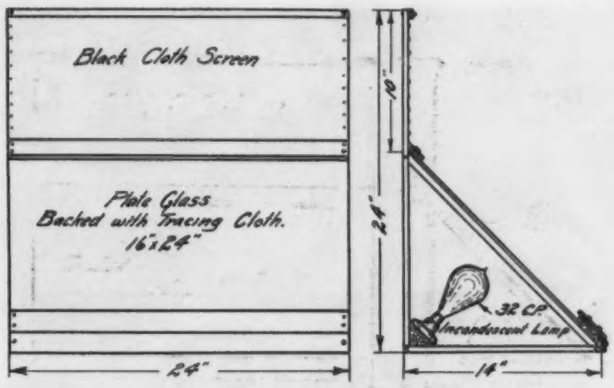


Fig. 2. Retouching Stand.

glass working surface to be without illumination may be blocked off by pasting black paper to the back of the glass. A black cloth screen extending above the working surface shuts off the undesirable light coming from the north window.

A BAD LAW THAT SHOULD BE CHANGED.

In the issue of the Journal of February 3, 1912, on page 97, there was published in full the details of Chapter 499 of the Statutes of California for 1911. This enactment was approved April 22, 1911, and is an act regulating the placing, erection, use, and maintenance of electric poles, wires, cables and appliances, and providing the punishment for the violation thereof.

No law, in recent years, has been so inconsistent and impossible of clear interpretation as this law appears upon careful study and an attempt to apply to given cases.

Anyone having suggestions for bettering this law is urged to send them to the editorial staff of the Journal of Electricity, Power and Gas.

In a discussion at the Los Angeles Section of the A. I. E. E. on May 21, 1912, J. E. Macdonald's paper brought up the question of the proper application of the new state law, No. 499, as applied to joint pole construction, in the State of California. From a careful study of this law, it appears that the specifications were drawn up to cover one company only, and afterwards a modifying clause was put in to provide for joint pole construction. This modifying clause is both conflicting and ambiguous, and has probably caused more trouble and different interpretation of the law, than the entire remaining part.

Section "C" first provides for a clearance of four feet between low voltage wires and high voltage wires. It does not limit the number of arms, the distance the arms are apart, or the number of companies on the poles; it simply provides that low voltage wires must be at least four feet from the high voltage wires.

Section "C" further provides, where two or more companies for the distribution of electric light and power, occupy the same poles with wires or cables, the high voltage wires shall all be on one side of the poles, and the low voltage wires on the other side; with no less than thirty-six inch clearance in a horizontal line, and further provides that in such construction, all cross-arms shall be at least thirty-six inches apart in a vertical line. Now here comes the sticker:

1. With two distributing companies on one pole, if we keep our low voltage wires four feet from the high voltage wires, is it necessary to keep the high voltage wires on one side of the pole only?

2. With high voltage wires four feet from the high voltage wires, can we place our arms, which have only high voltage wires on them, two feet apart, just so the low voltage wire is put on the arm which is four feet from the high voltage wires? In other words, in combination work, if we keep our high voltage wires four feet from our low voltage wires, as provided for in the first part of clause "C," cannot we build and maintain our combination lines with the same construction as provided for in the first part of clause "C"? Does the thirty-six inch provision, and the provision for high voltage wires to be on one side of a pole, only apply when arms are put on the pole less than four feet apart?

3. What is meant by a distributing company in this clause "C"? Would a lighting company's high line, or a railway company's high line be classed as a distributing line on a combination pole, if the company who owns the high line had no other wires, than the high line wires on the pole? Take for instance where one distributing company has a high line on top of a line of combination poles, and a second distributing company makes combination on those poles, would it be necessary for this second company to place all their high voltage wires on one side of the poles, and all their low voltage wires on the other side of the poles? If that is the case, would not the distributing company who owns the high line be compelled to place their entire high line on one side of the poles also?

There are several other points, such as providing some way to buck arm with low voltage wires from a pole, other than compelling the buck arm to be four feet below the line arm, which carries the high voltage wires, for by this provision it throws the line cross-arms eight feet apart on our corners, and it is getting to be necessary to plant one-hundred foot poles to make some of our corners.

The above questions are only a few of the complications which the companies have been compelled to meet, and each company is deciding these questions in a different manner, and it is recommended that some concerted action be taken by the various companies, so that recommendations can be made to the proper authority before the next legislative meeting, to have the objectionable clauses corrected and the law amended, so that it will answer the purposes for which it is intended; that is, to require better and safer construction work over the entire state.

SHIPS TO CARRY WIRELESS.

R. Y. Cadmus, United States Inspector of ship wireless telegraphy for the Pacific Coast, with headquarters in San Francisco, received notification from the Department of Commerce and Labor that on and after October 1, 1912, all vessels carrying 100 persons, including the crew, must have two wireless operators and wireless apparatus with a radius of at least 100 miles. The inspector also was notified that after January 1, 1913, all ships carrying passengers must be equipped with wireless apparatus and day and night operators.

The Delegates to the Seattle Convention Aboard

AFTER FLASHES OF THE SEATTLE CONVENTION OF THE N. E. L. A.

The electrical Hegira from all parts of the United States to the Seattle convention of the N. E. L. A. presented an interesting spectacle. Six special trains and several special cars traversed the continent, or considerable portions of it, bringing visitors from Boston, New York, Philadelphia, Pittsburg, Chicago St. Louis, Mobile, Denver, Los Angeles, San Francisco and many other cities. All of these trains were finely equipped, and one especially elaborate tour-de-luxe was arranged, enabling those who participated to make a long, circular journey throughout the West, including a visit to the Grand Canyon and California. No less surprising in its brilliancy of detail was the Golden Poppy Special from California, which was planned in minutest detail for the comfort and pleasure of its passengers, by the Electrical Development League of San Francisco. The sight of a ten-car special trailing its luxurious course over the celebrated Shasta Route laden with electrical men from California is interesting and at the same time unique. Much credit is due the Southern Pacific Company and the Pullman Car Company for their efforts in getting together an undertaking hitherto unattempted in the West, and at the same time putting through this undertaking on schedule time.

A photograph of the party comprising the Golden Poppy Special, taken by the Wagner Electric Manufacturing Company, as a feature of their entertainment, is shown above. This photograph will be supplied to members of the Golden Poppy Special, with compliments of the Wagner Electric Manufacturing Company.

Truly Western style characterized the frolic enjoyed by all on board throughout the entire journey to Seattle. The train was elaborately decorated with golden poppies bearing the magic insignia "San Francisco, 1915." In the observation car was to be found a Victrolia and a full grown piano which was kept busy throughout the journey. A mock negro wedding proved of unusual originality and afforded keen pleasure to all.

On Monday evening preceding the convention, an elaborate ball was given in the Armory to all visiting delegates and their ladies by the Seattle electric power interests. The hall was beautifully and artistically decorated and the chic gowns of the visiting ladies made it resplendent and in full keeping with the magnitude of the art represented, for it is said that the membership of the N. E. L. A. comprises $2,500,000,000 in invested capital.

While the attendance at the convention was not as large as at some recent conventions, it was not expected that it would be, owing to the geographical location of Seattle to the center of population of the association membership. "Picked men" journeying from long distances, however, constituted a quality of attendance never before realized in the proceedings of this organization.

The program included over seventy addresses, papers and reports and covered a wide range of topics of increasing importance to the industry. Fifteen hundred keen observers commingling from every electrical center of the country not only gave these men an idea of the extent of the conception of the electrical development in the Rocky Mountain and Pacific Coast states but it has also facilitated first hand observation of a type of sturdy and alert Americanism that has its lessons for residents of the eastern and central sections of the country. Indeed, sectional intercourse of this sort paralleling and synchronizing currents in national hydroelectric life and central station practice is highly advantageous.

the Golden Poppy Special at Shasta Springs.

Trip to Snoqualmie Falls by Delegates.

Despite the threatening weather, about 480 persons were on hand Friday, June 14, for the special trip to the Snoqualmie Falls and White River developments through the courtesy of the Puget Sound Traction, Light & Power Company.

The special left at 8:30 and after three hours' traveling through the picturesque Lake Washington region, arrived at the Falls. About an hour was spent inspecting this unusual installation and viewing the inspiring falls, practically all of the visitors crossing the suspended foot-bridge and climbing the point to obtain the fine view of the latter. It was not possible to visit the "Cavity Station" in the valley 300 feet below, on account of the large crowd and small capacity of the elevator. A box lunch was served on the train, followed by refreshments of all kinds throughout the afternoon. About twenty miles from the Falls an accident to one of the engines delayed the train for a considerable time, so that on account of the lateness in reaching Seattle about half of the delegates decided to abandon the trip to White River and returned direct to Seattle. The other half proceeded to the White River plant, arriving about 5 o'clock. After reviewing this most interesting installation the party returned to Seattle, everyone voting it a most enjoyable and profitable day. The visiting delegates wish to extend their thanks to the Puget Sound Traction, Light & Power Company for the delightful trip and for their thoughtfulness and courtesy throughout.

Portland's Hospitality.

Portland was not asleep to the call of western hospitality and the returning delegates on Saturday, June 15, found three delightful trips planned, which were consummated with joy to the visitor and much credit to Portland talent. Trip No. 1 included a trip to the Cazadero River Mill hydroelectric plant. Trip No. 2 comprised a 30-mile trip up the Willamette River by boat or rail with a stop-over at Oregon city. Trip No. 3 was completed in seeing Porland—the Rose City—by special observation cars. In the evening the electrical parade of the Rose Festival was enjoyed from special grandstand accommodations, which controlled an excellent view of the festivities.

N. E. L .A. CONVENTION EXHIBITS AT SEATTLE.

In connection with the 35th annual convention of the National Electric Light Association at Seattle, June 10-14, 1912, a number of interesting exhibits were made by the manufacturers.

American District Steam Company displayed samples of fittings for district steam heating and distributed descriptive literature. E. L. Barnes was in charge.

Benjamin Electric Manufacturing Company showed a full line of Benjamin lighting specialties including sockets and shades. These were ably demonstrated by W. D. Steel, F. H. Poss and M. F. Steel.

Century Electric Company exhibited a full line of Century single phase motors and illustrated several of the wide number of domestic and industrial uses to which they are applied. R. J. Russell, H. H. Thedinger and S. B. Smith were in attendance.

Commercial Section N. E. L. A. distributed literature on the application of electricity, P. S. Dodd being in charge.

Copeman Electric Stove Company demonstrated automatic cook stoves. L. W. Copeman and K. W. Dawson were present.

Dalton Adding Machine Company showed a representative line of adding machines.

Dearborn Drug & Chemical Works occupied attractive quarters where they distributed literature on treating boiler feed water, lubricating oils and greases. E. C. Brown, J. W. Harkins and J. B. Lincoln were the representatives.

Electric Storage Battery Company occupied two booths with a comprehensive exhibit of storage batteries for ignition,

and electric vehicle service. Attractive literature on large battery plants was also distributed. Those in attendance at the convention from this company included G. H. Atkin, J. Gay, G. R. Murphy, W. G. Bardens, H. S. March, J. W. Conley.

Electrical Review and Western Electrician of Chicago was represented by A. A. Gray and F. R. Schalck.

Electrical World of New York City published the Convention Daily and had ten representatives in attendance.

Eureka Vacuum Cleaner Company demonstrated their product.

Federal Sign System (electric) had an attractive exhibit of electric signs and demonstrated several household specialties, including their power table, vacuum cleaner and "Dim-a-Lite." J. H. Goekst and J. M. Gilchrist were in this booth.

Fort Wayne Electric Works of General Electric Company had a representative exhibit of small motors, fans, transformers and meters, also illustrating the application of Fort Wayne motors to a refrigerating machine. A special feature was the initial exhibit of the Audiffren-Sungrun refrigerating machine. F. S. Hunting, G. I. Kinney, W. R. Hendrey and H. L. Eicher were present.

Franklin Electrical Manufacturing Company displayed Franklin incandescent lamps. P. W. Huston and R. D. Holabird represented the company.

General Electric Company occupied six spaces with an instructive exhibit of apparatus in actual operation. This included an induction regulator, color matching outfit, and typical G. E. motors, among them being a 25 h.p. mining type motor. The lamp exhibit included a full showing of Mazda lamps, an intensified arc for a.c. circuits, a long life flame arc and several luminous arcs. Various standard heating and cooking devices were displayed, the radiant grill and domestic range commanding especial attention. A 1 kw. combination gasoline engine and generator was another of the interesting features. An indicating steam flow meter was also shown. Those in attendance were R. J. Lovejoy, C. W. Stone, Dr. Thos. Addison, J. A. Cranston, T. E. Bibbins, R. J. Cash, Theo. Beran, R. E. Moore, H. L. Monroe, G. D. Rosenthal, C. E. Burleigh, C. H. Alexander, A. K. Baylor, F. G. Vaughen, M. O. Troy, N. R. Birge, D. B. Rushmore, E. E. Gilbert, Frank H. Gale, A. D. Page, G. C. Osborn, R. B. Parker, F. M. Sanford, John Howell, W. R. Burrows, C. M. Bliven, Frank Stone, C. R. Wallis, J. W. Van Huysen, A. S. Heyward, A. G. Jones, A. S. Moody, H. E. Duren, E. F. Whitney, H. Oliver, I. A. Shorno, H. A. Boring, E. C. Fellows, and A. D. Pritchard.

G. & W. Electric Specialty Company showed pot heads and junction boxes, being represented by G. P. Edmonds and R. L. Phelps.

Hubbard & Company displayed a large line of pole line equipment and tools. R. N. Dickinson and A. E. Boyles were there.

Hughes Electric Heating Company demonstrated electric cook stoves.

Hurley Machine Company showed the operation of their washing machine, N. Hurley being in charge.

H. W. Johns-Manville Company occupied three spaces with an elaborate display of fuses, boxes, insulating and construction materials, as well as fibre conduit and fittings. A special feature was the initial exhibit of the Audiffren-Singrun refrigerating machine. Linolite lamps and Frink reflectors were attractively shown as was also a complete line of asbestos products. Those in charge were J. W. Perry, R. C. Cole, S. P. Russell, G. A. Saylor, F. W. Loomis, G. G. Gunderson and S. F. Mills.

Meter Exhibit N. E. L. A displayed a comprehensive line of meters and meter accessories.

Metropolitan Engineering Company showed electric protective devices.

Mineralac Electric Company displayed electric meters and insulating materials. H. S. Sines and C. N. Arnold were there.

National Electric Lamp Association occupied four central spaces with a brilliant showing of many styles and types of incandescent lamps. These were attractively displayed to great advantage by various novel arrangements. Representatives in attendance included J. Robert Crouse, H. A. Tremaine, S. E. Doane, W. M. Skiff, W. Harrison, L. S. Twomey, R. Beman, R. E. Campbell, J. A. Vandergrift, H. Eisenmenger and E. H. Haughton.

Otis Electric Company distributed literature on elevators.

Pacific Electric Heating Company occupied two spaces with an attractive display of electric household heating devices. F. Booth, H. T. Van Riper, J. N. Bowden and H. T. McCrea were in attendance.

Philadelphia Electrical Manufacturing Company exhibited lighting devices, C. L. Bundy being in charge.

Portland Railway, Light & Power Company distributed thousands of roses.

Simplex Electric Heating Company demonstrated a great variety of electric heating devices. These included electric ranges, hot closets, buffet servers, plate warmers, chafing dishes, percolators, tea sets, toasters, griddles, broilers, waffle irons, milk warmers. Electric radiators, circulation water heaters, foot warmers, heating pads, curling irons and laundry irons were also exhibited. Special attention was called to the "enamel method" in the heating elements and the "lock on" arrangement. The exhibit was in charge of J. S. Ayer, assisted by Garnett Young, F. G. Larkin and F. H. Smith.

Wagner Electric Manufacturing Company demonstrated their unity power factor motor, switchboard instruments and alternating current rectifiers in two central spaces. F. N. Jewett, J. Mustard, A. J. Myers, T. S. Clark, F. R. Bates and Ray D. Lillibridge were in attendance.

Waverley Company, represented by F. T. Bird, showed an electric automobile.

Western Electric Company made a comprehensive display of fans, telephones, vacuum cleaners and electric household appliances. F. B. Gleason, P. J. Aaron, Carl Bush, M. H. Nichols, F. Parish and A. L. Philips were in charge.

Weston Electrical Instrument Company gave a graphical demonstration of their switchboard ammeters, voltmeters, frequency meters, power factor meters and synchroscope. They also displayed a large number of portable and precision meters. F. E. Smith and A. Honeychurch were in charge.

Westinghouse Company occupied six spaces. Those in charge were: G. E. Tripp, L. A. Osborne, S. L. Nicholson, W. W. Briggs, C. S. Cook, G. B. Griffin, J. C. McQuiston, A. A. Brown, W. S. Rugg, J. J. Gibson, W. E. Brett, T. P. Gaylord, C. E. Heise, K. E. Van Kuran, A. Tobias, J. W. Busch, Geo. W. Ewing, Stephen Gardiner, S. I. Hayes, A. M. Irwin, W. D. McDermott, B. C. Mannell, T. J. Pace, E. A. Thornwell, L. L. Warfield, P. N. Kellock, and Messrs. Sailor, Milton, Robeshitte, Lamont and Whaling.

A complete line of carbon and oil circuit-breakers, switchboard and portable indicating meters, watthour meters, arc lamps and headlights, transformers, oil treating outfits, regulators, rectifiers, lightning arresters, insulating material, small motors, a complete line of fans and heating devices.

A switchboard has mounted thereon a complete line of the Westinghouse indicating meters with seven-inch dials, showing in a very convincing manner the saving in switchboard space to be gained by their use. These meters are connected to live circuits and thus are shown in actual operation, one being in series with a "skedoodle" plug, illustrating its dead beat qualities.

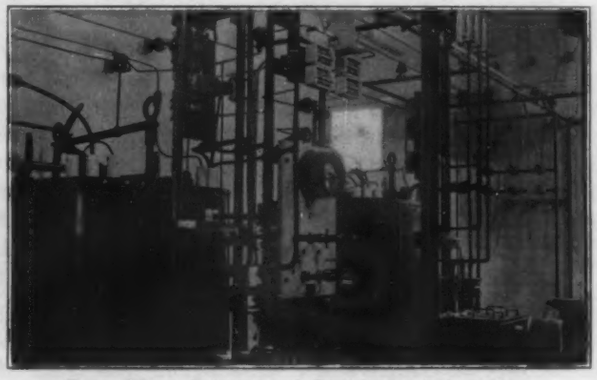
A complete line of modified types of carbon circuit-breakers of the laminated stud type for use on either a.c. or d.c. circuits were shown.

WESTERN STATES GAS AND ELECTRIC COMPANY'S RICHMOND HOLDINGS.

In the issue of this Journal of April 27th a detailed account of the Stockton plant of the Western States Gas and Electric Company was given. At the same time that the Stockton holdings were taken over by the Western States Gas and Electric Company, which was, as has been stated, in November of 1910, the Richmond Light and Power Company was also absorbed by this same corporation.

Exterior View of Distributing Station.

In 1902, Point Richmond, then only a sparsely settled rural district, saw the beginning of what came to be known as the Richmond Light and Power Company. The original installation consisted of a 100 kw. generator driven by double expansion reciprocating engine. In 1908, three 100 kw. transformers, stepping down from 11,000 to 2400, were added in order to assist peak load conditions by purchasing power from



Rear View Interior of Richmond Substation.

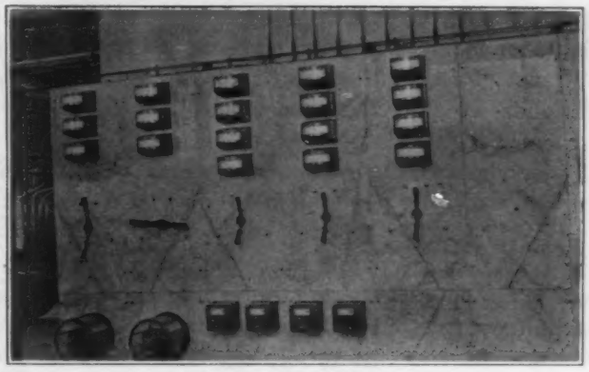
the Pacific Gas and Electric Company. During this brief period Richmond had grown from a settlement of but a few hundred people to a rising young city of 10,000.

To-day, however, the entire local generation of power has been done away with and all the electrical energy required is purchased from the lines of the Pacific Gas and Electric Company. A thoroughly modern reinforced concrete building, 46:6 ft. by 39:6 ft., has been erected to house the main substation equipment. This building is located on the corner of in Richmond.

Here are to be found three 100 kw., 10,000-2400-volt oil-insulated, air-cooled General Electric transformers and also three 200 kw., 10,000-2400-volt, oil-insulated, air-cooled Allis-Chalmers transformers. Hartman switches are used throughout on all distributing circuits as well as on the main feeder circuit.

Three mercury arc rectifiers of the General Electric type, 60 cycles, with a primary voltage of 2200 and rectifying voltage of 4500, provide constant direct current to the extent of four amperes. This current is used to supply 115 General Electric Series Luminous magnetite arcs, although the rectifiers are sufficient in capacity for 150 arcs of similar make.

The company is now using an automatically controlled feeder regulator, induction type, 60 cycle, with primary amperage of 2450 and secondary amperage of 150 G. E. Type I. R. T.



Switchboard Front.

Horn lightning arresters are used with surge dischargers of the General Electric type set for 6.6 amperes maximum and 4500 volts. The 11,000 volt distribution circuit owned by the Western States Gas and Electric Company comprises six miles known as the "County Road," three miles as the "San Pablo," two miles as the "Los Angeles Press Brick," and three and one-half miles as the "Point Orient" line.

The offices of the company are housed in the Neill

Office at Richmond.

Building in comfortable quarters. This building is located in the heart of the rapidly growing business district of Richmond.

BATTERY CAR TRAVELS FAR.

With a capacity of carrying 30 people at 30 miles an hour and running 360 miles without a recharge, the first Edison electric storage battery railroad car to be used west of the Rocky Mountains has arrived in Seattle and will go to Alaska on the steamship Edith. The new car will be placed in operation on the Tanana mines railroad between Fairbanks and Chatanika. It cost $38,000 at New York and was purchased by Falcon R. Joslin, president of the road that will use it, to eliminate the heavy cost of fuel in Alaska. Many similar cars are in operation in Europe, Japan and New Zealand.

WESTERN LAWS OF ELECTRICITY AND WATER

RIGHTS OF WAY OVER PUBLIC LANDS.

For Ditches and Reservoirs.

BY A. E. CHANDLER.

As stated in the first article of this series the first congressional legislation regarding rights of way over the public domain was the Act of 1866, now Section 2339 of the Revised Statutes of the United States. It acknowledges and confirms rights of way for ditches used in connection with "vested and accrued" water rights for "mining, agricultural, manufacturing, or other purposes." It is still in force for all unreserved public lands for purposes other than the generation of power.

By virtue of the provisions of the Act of 1866, one may go upon the public domain, dig his ditch, divert and apply water to beneficial use, and thus secure right of way over the land occupied. As the act recognizes only rights of way for ditches used in connection with vested water rights, it would seem that no right of way would attach until the completion of the works so that the water could be diverted. The California Court of Appeals has held otherwise, however, in de Wolfskill v. Smith (89 Pac. 1001.) The plaintiff had posted notices of water appropriation at abandoned oil wells, on unoccupied public land, from which water was flowing. She proceeded with her ditch construction with due diligence until enjoined by the defendant Smith who had made homestead entry on the land soon after the notices were posted. Although the court points out that the posting of a notice "does not constitute an appropriation" and that the "right to water depends upon * * * making an actual appropriation of its use," it holds.

By posting the notice appellant (plaintiff) from that time became vested with the right to the use of the stream of water then flowing from these wells, together with the right to construct over and across the land the necessary ditches to divert and conduct the same to the place of intended use.

It is certain that as against the government the water right is not considered vested until the diversion works are completed and ready for use. Under the provisions of the Reclamation Act the public lands within a reservoir site, known as Alkali Lake, in Antelope Valley, California, were withdrawn from entry. The Rickey Land and Cattle Company owned all the private land within the site and also irrigation ditches running from the West Walker River to the site, which it intended to use for storage purposes. It applied for right of way over the public land within the reservoir site under the Act of 1891, and, after the rejection of its application by the Secretary of the Interior, it proceeded with the construction of a tunnel outlet, claiming that its rights were vested under the Act of 1866. The government, in the interest of the Reclamation Service, thereupon instituted suit and the company was enjoined from prosecuting the construction work. (U. S. v. Rickey Land & Cattle Company, 164 Fed. 496.) In this case it was impossible to use the reservoir before the completion of an outlet tunnel and channel for the return of the stored waters to the West Walker River. After quoting Sections 2339 and 2340 of the Revised Statutes the court says:

It is very clear that no one can under these sections acquire as against the government, a vested easement in and to public lands, for a reservoir site, until the actual completion of the reservoir, so that the waters to be impounded therein may be applied to the beneficial uses, contemplated by the irrigation system of which it forms a part.

This was the construction placed upon these sections by the Supreme Court, in Bear Lake Irrigation Company vs. Garland, 164 U. S., pages 1, 18 and 19, in which case it was said:

It is the doing of the work, the completion of the well, or the digging of the ditch, within a reasonable time from the taking of possession, that gives the right to use the water in the well or the right of way for the ditches or the canal upon or through the public land. Until the completion of this work, or, in other words, until the performance of the condition upon which the right to forever maintain posession is based, the person taking possession has no title, legal or equitable, as against the government.

Regardless, therefore, of the doubtful logic of the de Wolfskill case, no one planning any material diversion work should rest upon the Act of 1866, but should secure his right of way or permission to occupy public lands before initiating actual work.

Act of March 3, 1891: The Act of March 3, 1891, grants rights of way over public lands and reservations for irrigation ditches and reservoirs upon the approval of applications by the Secretary of the Interior. Such applications must be filed with the register of the land district in which the ditch or reservoir is to be located. The required contents of papers and maps forming the application are specified in detail in the regulations of the General Land Office, and the applicant must follow the directions to the letter. (Copies of the regulations will be sent on request to the General Land Office, Washington, D. C.) The right of way granted extends, where necessary for construction on maintainance, "fifty feet on each side of the marginal limits" of the ditch or reservoir, and the term "marginal limits" has been construed to mean the high water line. The right is also given to take from the adjacent public land material, earth and stone necessary for the construction work, but it has been held that this right is for construction work only and not for repairs or improvements.

The act specifically provides that "the privilege herein granted shall not be construed to interfere with the control of water for irrigation and other purposes under authority of the respective states and territories." The land office accordingly does not attempt to regulate appropriations of public waters but simply insists upon a showing by the applicant that the state or territorial laws governing water rights have been complied with.

The act further provides that if any part of the

ditch shall not be completed within five years after its location the right of way for such part shall be forfeited. Regarding such forfeitures, the Secretary of the Interior has held that the jurisdiction of the Interior Department is lost upon the approval of an application, and any action looking to the cancellation or annulment of the right of way must be brought in the courts. The regulations call for the filing of affidavits on the completion of the ditch or reservoir. If the line of the right of way as granted has been departed from, new maps and field notes must be filed and the right to the original but unused line relinquished.

The act also provides "that no such right of way shall be so located, as to interfere with the proper occupation by the government of any such reservation, and all maps of location shall be subject to the approval of the department of the government having jurisdiction of such reservation." Under this provision the Forest Service has prepared special regulations governing rights of way through the national forests. No construction work in a national forest will be allowed on such rights of way until the application has been approved by the Secretary of the Interior, or unless permission for such work has been specifically given, and as a condition precedent to such approval the applicant must enter into such stipulation and execute such bond as the Forest Service may require. For ditches and reservoirs occupying part of government reservations other than national forests, no application for right of way will be approved by the Secretary of the Interior until it has been approved by the department in charge. If the right of way is upon unsurveyed lands, the map must be filed within twelve months after the official survey thereof, and no application for such right of way can be approved prior to the official survey.

The following paragraph from the regulations clearly states the nature of the grant of right of way under the act of 1891:

The right granted is not in the nature of a grant of lands, but is a base or qualified fee. The possession and right of use of the lands are given for the purposes contemplated by law, but a reversionary interest remains in the United States, to be conveyed by it to the person to whom the land may be patented whose rights will be subject to those of the grantee of the right of way. All persons settling on a tract of public land, to part of which right of way has attached for a canal, ditch, or reservoir, take the land subject to such right of way, and at the total area of the subdivision entered, there being no authority to make deduction in such cases. If a settler has a valid claim to land existing at the date of the filing of the map of definite location, his right is superior, and he is entitled to such a reasonable measure of damages for right of way as may be determined upon by agreement or in the courts, the question being one that does not fall within the jurisdiction of this department. Section 21 of the act of March 3, 1891, provides that the grant of a right of way for a canal, ditch, or reservoir does not necessarily carry with it a right to the use of land 50 feet on each side, but only such land may be used as is necessary for construction, maintenance, and care of the canal, ditch, or reservoir. The width is not specified.

Act of May 11, 1898: The Act of May 11, 1898, authorizes the use of rights of way granted under the Act of 1891 for purposes subsidiary to the main purpose of irrigation, as is shown by the following clause from section two of the act:

And said rights of way may be used for purposes of water transportation, for domestic purposes, or for the development of power, as subsidiary to the main purpose of irrigation.

In all cases the applicant must prove to the satisfaction of the Interior Department that the intended use, other than irrigation, is really subsidiary thereto, and the proof must be especially clear where the development of power is contemplated.

Act of February 1, 1905: Section four of the Act of February 1, 1905, authorizes the Secretary of the Interior to grant rights of way through national forests to citizens and corporations of the United States "for municipal or mining purposes, and for the purposes of milling and reduction of ores." The nature of the grant is the same as that under the Act of March 3, 1891, except that no right is given to take any material, earth, or stone for construction or other purposes, and that the right of way is restricted to the strip necessary for the construction and maintenance of the works. Applications are made in the same way as those under the Act of 1891.

Act of February 15, 1901: Although other uses are specified in this act, it is now of importance only in regard to rights of way though the public lands and reservations for reservoirs and canals for the generation of electric power, and for electric transmission, telephone and telegaph lines. It is provided in the act that any permission given thereunder may be revoked by the Secretary of the Interior in his discretion. The right granted is a mere license, revocable at any time, and does not carry with it permission to take material, earth, or stone from the public lands or reservations for construction or other purposes.

For permission to occupy land outside of the national forests applications must be made in the same way in general as under the Act of 1891. Where the entire right of way lies within an Indian Reservation the application must be filed with the Commissioner of Indian Affairs.

Rights of Way for Power Purposes Through National Forests.

The Act of February 1, 1905, transferred the administrative control of the national forests from the Interior Department to the Department of Agriculture, so that the revocable license for electrical plants (ditches, reservoirs, transmission lines, etc.) is now given under the authority of the Secretary of Agriculture. The Use Book—Water Power—of the Forest Service sets forth in detail the regulation and instructions regarding such licenses or "permits." The first, second, fifth and sixth paragraphs of the 1911 regulations are as follows:

REG. L-1. Preliminary water power permits will allow the occupancy of the lands of the United States within national forests for the purpose of securing the data required for an application for final permit and for such construction as may be necessary to preserve water appropriation during that period. Final water power permits will allow the occupancy and use of such lands for the construction, maintenance and operation thereon of works for the

main purpose of the generation of electrical power. Preliminary or final permits for commercial water power works, or for non-commercial water power works of a capacity in excess of one thousand (1000) horsepower, will be granted, extended, and renewed only by the Secretary of Agriculture. Permits for non-commercial water power works of a capacity of one thousand (1000) horsepower or less, and for transmission lines, not a part of any water power works covered by a water power permit will be granted, extended and renewed by the District Forester. The Secretary of Agriculture alone may revoke water power permits.

REG. L-2. The "non-commercial water power works" will be applied to water power works owned and used solely by the permittees for one or more of the following purposes: In the operation of their own mines, or in the milling and reduction of ores therefrom; as auxiliary to irrigation works owned and operated by permittees; temporarily, in the construction of other works for which permission has already been granted the permittees; by municipalities for municipal purposes; or for such other miscellaneous uses not herein enumerated as may be determined by the Secretary of Agriculture to fall within this class. No charge will be made for the use and occupancy of lands for non-commercial water power works. All other water works will be termed "commercial."

" * * * REG. L-5. Occupancy and use of national forest lands is the sole privilege granted under a water power permit. In the issuance of such permits no attempt will be made to adjudicate water rights, since water rights are acquired under state laws and adjudicated by the courts. Therefore no protests against the granting of an application, if based upon alleged lack of water rights, will be considered; nor, in general, will any allegation that the time of beginning or completion of construction has been or is delayed by litigation over water rights be accepted as a sufficient reason for granting any extensions of time.

REG. L-6. Unless sooner revoked by the Secretary of Agriculture, a final water power permit shall terminate at the expiration of fifty years (50) years from the date of the permit, and may then be deemed to be an application by the permittee for a new permit to occupy and use such lands as are occupied and used under the original permit: Provided, That the permittee shall, not less than nor more than four years prior to the termination of the permit formally notify the Secretary of Agriculture that it desires such new permit, and will comply with all laws and regulations at such time existing, regulating the occupancy and use for water power purposes of lands of the United States within the national forests.

Applications must be filed with the District Forester of the district in which the lands to be occupied are situated. In approving an application the time for beginning and completing construction is specified. Before a final permit for commercial water power works can be secured, the applicant must execute a stipulation providing among other things for the payment annually in advance of such charges as may be required by the Secretary of Agriculture, for the installation and maintenance of approved hydraulic measuring devices, and for the inspection of books and records showing stream flow and reservoir data and amount of electric energy generated.

Special State Legislation Regarding Water Rights for Power Purposes.

As previously stated, water rights for all purposes are generally considered to exist as long as the use continues, but water rights for power purposes have been limited to fixed periods in California and Oregon. The latter State in 1909 fixed the period at forty years with a preference right of renewal, for a period then fixed by law, and California, at the regular legislative session of 1911, fixed the period at twenty-five years, but changed it to forty years at the special session of the same year. Each State by its new legislation levies an annual charge for power development depending upon its magnitude.

This special water power legislation was undoubtedly suggested by the regulations of the Forest Service. It is an attempt to regulate the so-called "power monopoly"—the underlying idea being that no permanent rights should be given and that the power company should in a small measure share its earnings with the State. Regarding the Oregon legislation State Engineer Lewis in his Third Biennial Report, (1909-1910, pages 82, 83) says:

The annual tax idea seems to be based upon the fact that water is the property of the public, and those who enjoy a right to its use should pay something to the state for the privilege. It was not recommended or approved by the Oregon Conservation Commission. Whether the basis for electric power charges will be to "charge all the traffic will bear" as in railway rates, is a matter of uncertainty. The price of electric power is being constantly lowered through competition with steam producer gas, etc., where the cost of production has been greatly reduced in recent years through improvements in methods and machinery. Only those water powers will be developed where the cost of production will permit successful competition with these other power producing agencies. If, in addition to the necessary development cost a heavy annual charge per horsepower must be paid the state, it is conceivable that such charge may defeat rather than promote the conservation idea, as well as retard development. We will be consuming our limited supply of coal, for economic reasons, while our water power remains undeveloped and goes to waste year after year.

Comments on Water Power Legislation.

A little reflection should suggest that the present special legislation regarding water power falls far short of the desired goal—the protection of the public. When the right of way act of February 15, 1901, was passed, little was known of practical rate fixing and the revocable license appealed to many as a needed curb. Later the annual charge was fixed by departmental regulation. The legislation and regulations are especially designed for the "commercial" power companies—that is, those engaged in public service. The right of the state to regulate public utilties and fix the rates of public service companies is now undisputed. For years the rates of water companies have been fixed throughout the entire country, later the railroads were taken in hand, and now public service commissions in a great number of states have been empowered to fix the rates of every public service company. The movement is so wide-spread and has been so generally accepted without litigation by the companies involved that its adoption by every state in the near future is certain.

Being assured that the state can and will insist upon rates which are reasonable, all that remains is to prevent the state or nation from giving to a public service company a property right which may be capitalized. Thus far no such preventive action has been

taken. Although the permit to occupy the public lands is revocable and the water right in California and Oregon is but for a fixed period, they are rights which are bought and sold and on which the company expects the consumer to pay a good return. Likewise the annual charge made by state and nation must be paid by the consumer—even where rates are fixed by a commission, as it is a legitimate operating charge.

It is now generally conceded that the fixed period idea is wrong economically. Although a preference right to continue after the end of the period is promised the permittee, it is subject to future legislation, the nature of which can not be prophesied. The result is that the operating company must charge a comparatively high rate in order to return the capital invested within the fixed period, and the chance of poor maintenance near the end of the period is decided.

Many state and federal officials are now ready to recommend an indeterminate license in place of the fixed term or revocable license. The indeterminate license is to be granted subject to the condition that the works may be taken over at any time by the state, or other public unit, at a valuation to be fixed by the state public service commission. As such taking is very unlikely in any given case and as it will become more and more so as the public service commission become older and stronger, the indeterminate license has almost the assurance of a perpetual right, conditioned only on proper operation. If such license is granted on the further condition that no rights of way, franchises or water rights secured from the state or nation can be capitalized for either rate fixing purposes or in cases of taking as above, the public is certainly protected in full measure.

State Versus Nation.

During the past few years withdrawals from entry of public lands for power sites have been made in large numbers. The Land Classification Board of the United States Geological Survey has charge of the examination of such withdrawn lands, and all future applications for rights of way for power purposes over public lands outside of national forests will be passed upon by the engineers of the board.

Comparatively recently a movement has been gaining weight to have the nation transfer the "power site withdrawals" in trust to the states. To many, of whom the writer is one, this suggestion is a step backward. In the last article attention was called to the doubtful water rights of interstate ditches. If the suggested step be taken the right of way of such ditches would be equally doubtful and the same question would be raised regarding interstate transmission lines.

In all phases of legislation the struggle should be for uniformity. There are but two federal departments concerned in the regulations regarding rights of way and the minor differences in their points of view are being rapidly eliminated. It would take many years to bring the many western states into such unison. Conceding for the purposes of argument only that the technical men of the federal bureaus are not better trained than those in the state offices, the longer period of service and greater freedom from politics are sufficient to make the federal bureau the more effective. It must be remembered also that in each of the western states land matters and water matters are handled by different offices having little or nothing in common. The embarrassment would be thus increased.

A real difficulty in the way of an early settlement of the whole question is that the present is a transition period. The public service commissions with their full control of all public service companies are so new that their existence is either not recognized or their worth is questioned. When they have demonstrated their efficiency there will be no further excuse for either federal bureaus or state water commissions attempting to regulate the power business. It has been shown that the state and not the nation has control of water rights. There is no more reason, therefore, for the nation charging an annual tax depending upon the amount of power developed—which, of course, is a function of the water right—than there is for demanding of a railroad company, as a condition precedent to grant of right of way, that it must pay an annual charge depending upon the traffic handled. The nation as owner of the land should give a right of way or indeterminate license conditioned upon construction within a specified time and leave the question of regulation to the state public service commissions.

To repeat, the future congressional and state legislation regarding water power development will depend upon the state public service commissions. If they prove efficient, as there is every reason to believe, the public should insist that all other agencies stay within their proper spheres and stop tampering with the regulation of public utilities.

CALIFORNIA COMMISSION NOTES.

The Home Telephone Company of Covina has applied to the Railroad Commission for permission to sell 369 shares of common stock at $50 a share. It desires to use the proceeds to take up notes to the amount of $16,500. The Home Telephone Company of Covina has an authorized capital stock of $200,000. It operates in Covina and Azusa.

The Peoples Water Company of Oakland has applied to the Railroad Commission for authority to issue a note in the sum of $71,000 and to pledge therefor as collateral security bonds to the amount of $100,000. The note is to carry six per cent and to be placed with the Central National Bank of Oakland to take up other notes.

The Western Union Telegraph Company has presented to the Railroad Commission a revised schedule of rates and has asked that it become effective on July 1st. The schedule contains a number of reductions covering a wide section of the state. An application for similar reductions was made to the Commission in May by the Postal Telegraph Company. The rates as now proposed by the Western Union would bring the two schedules to approximately the same basis. The matter will be given an early consideration and if the Commissioners find no objection, the rates as revised will go into effect on July 1st.

REGULATION OF WATER POWER DEVELOPMENT.[1]

BY E. G. HOPSON.

In countries like Australia practically all public service is under public control, and communities desiring state or municipal improvements apply to the government both for designs, construction and operation of works. In some European countries similar conditions obtain, and government control has thus become thoroughly incorporated into the social structure. In this country privately owned and controlled public service corporations perform most of these functions, particularly in connection with light and power. These concerns have developed great systems of works and occupy practically the entire field. The water powers remaining under state and federal control are mostly undeveloped and, to a very large extent, are located in the more remote localities, so that they are not immediately available for use in the logical order of commercial development.

It may be possible to devise a scheme for developing these water powers by the direct action of the government or state, or both, but it should not be overlooked that this will not mean complete government ownership of light and power, but only a share of the field, the private concerns being already well intrenched in the most strategic points. What would be the outcome if the government proceeded to develop the new powers in competition with the privately owned power plants already built is another matter.

First of all, the government would be competing with its own citizens in commercial work, which is an undesirable situation. Such competition, however, could only end in one way, as the resources of the government are so much greater than those of the largest private interests. If the government seriously undertook rate cutting regardless of economic considerations, the private concerns would be forced out of business or would be absorbed by the government itself. In all probability no actual competition will result, as private interests, realizing the situation would surrender at the outset. What, however, would be the object of such competition? Would the purpose be to drive out private ownership or merely to control it? The latter having generally the best strategic positions today, could, if their resources were equal to those of the government, win out in any rate-cutting competition. The entrance of the government into the field with the avowed policy of rate cutting would, however, necessarily be the end of all private enterprise.

Is this the result we are after? It seems to me the point to be attained is not the elimination of private enterprise, but the securing of reasonable rates to the consumer. We are not yet ripe for the wide adoption of government ownership of this utility, i.e., to the extent of ousting those already engaged in the work. We do, however, desire to prevent unjust and unreasonable rates. Monopoly cannot be avoided, nor does it appear worth while to make any attempt so to do. Production of power is cheaper and more reliable by large plants than small ones, and monopoly there must be either under public or private control. I believe the public will be sufficiently served by rate regulation of all light and power corporation coupled with governmental examination and supervision of the business methods and accounting of the operating concerns.

The public will be satisfied if these corporations obtain a reasonable profit, because, after all, that is what everybody is looking for, provided their methods are reasonably well conducted and efficient. It does not desire to control or operate these plants, as that would involve a governmental machinery far too complicated and cumbersome and might entail evils greater than such excessive rates as may obtain in some cases

It therefore seems to me that the state and federal government should not embark on a policy of wholesale construction and development of the new water powers with a view to using such action as a club over the private interests already operating, but should proceed, first, to perfect machinery to supervise and regulate them in the interests of the general public, with due regard to the legitimate rights of the investors in such concerns, and, secondly, methods should be devised for the development of the new powers to keep pace with the growing needs of the community.

Whether the development of the new water powers can best be handled by public or private means is a matter for consideration. In some cases private capital can probably be used to the best advantage, subject, of course, to regulation and control. In other cases, where large comprehensive schemes beyond the scope of private enterprise are involved, the work can be best handled by federal or state authority. It seems to me, however, that no arbitrary rule can be made covering all cases, and it appears particularly inadvisable in our present incomplete knowledge of the technical features of any proportion to dogmatize as to its merits or demerits.

The point on which we will probably all agree is that some expert body should carefully consider and weigh these matters and try to devise a plan for recommendation to the state government, possibly to congress. My present idea is that the state should in any event appoint a public service commission empowered thoroughly to scrutinize the business of all light and power corporations operating in the state and should legislate to compel all such corporations to make regular reports to the commission and to submit its accounts to the inspection of the commission, as may be required, and to fix no rates for sale of power save with the approval of the commission. This seems to be the first and most necessary step. It will establish the principle already partly established in other states, that these concerns are not of a purely private character; that the public affording them facilities to carry on their business, insists on a share of control of the business and reasonable rates. This principle once established may be capable of wide extension as recognition of the rights of the public becomes enlarged.

In addition to the control of existing power companies by a public service commission, we are faced with the necessity of providing for the development

[1]Paper read at the Commonwealth Conference of the University of Oregon, May 25, 1912.

of the new powers, this development being now practically held in abeyance through a deadlock between state and federal action. The state claims to own and control all waters of the state and has provided legislation and machinery for the purpose. In the majority of cases of the large undeveloped powers in this and other western states the sites are still in public ownership, and these lands being withdrawn from entry in furtherance of the policy of conservation and development being therefore impracticable.

The present condition is anomalous and should be terminated. I know of many worthy plans for development that would have been started to the great public advantage but for this deadlock. As matters now stand there is no legal provision for regulating the entry of these lands. The present withdrawal must, therefore, continue until congress takes action of some kind. What this action will be is entirely in the air. One school advocates the most radical system of government ownership, while others would be willing to restore these lands to entry with little, if any restriction. It may however, be taken for granted that these power sites will never be opened to unrestricted entry as in the past. Some control and regulation will be established, and this is where the state can greatly aid congress by its advice and co-operation.

Under the new Oregon water code a system of fees has been established on all water power development, the amounts being proportioned to the power developed. While unquestionably this system is far in advance of what existed before, it does not quite appeal to me as being the kind of control best suited to the public interest. Whatever the amount of the fees may be, they are merely a tax on the consuming public, it being evident that the power companies will ultimately shift the burden to the consumer. The entire principle of establishing fees is wrong unless we regard the question purely as a revenue-producing one and select power development for taxation simply on this basis. As now applied, it is similar in effect to that of an internal tax on coal paid by the mine operators for each ton produced at the mines, in which case there would be little doubt that the public would bear the burden and not the mine operator. It seems to me we do not need taxation or fees, but rate regulation or public ownership and operation. In all probability both the latter will be beneficial under the diverse conditions that obtain in different localities.

Rate regulation is unquestionably a long step toward public ownership, and it takes no vivid imagination to picture the growth of one into the other as time goes on. It seems, however, to go a long way in meeting the desire of a large portion of the public for some kind of positive control by the public of public utilities. It provides at the same time a reasonable outlet for the energy and activity of private enterprise and an opportunity for the utilization of great masses of private capital available for profitable development. Properly devised regulation of rates means stable investments at reasonable profits because the prohibition of excessive profits through the action of a public service commission should entail a corresponding duty on the part of the public to insure reasonable returns on the invested capital and full public support in emergencies. From an investment standpoint regulated corporations should enjoy a stability and assurance that will eventually be found more attractive than the speculative features incident to those operating without regulation.

Actual public ownership and operation is not, in my opinion, a thing to be entered into too lightly. The machinery of the state and federal government is not suited for such burdens, nor is the public educated politically to a grade that will afford reasonable assurance of sustained efficiency in the operation of great public works entering intimately into the daily economics of the people. Almost the only government branch constructing and operating works that I know to be reasonably effective and economical is the Reclamation Service, and I have a full appreciation of the difficulties we live under in that organization in keeping our record even passably good. There is an irresponsibility and indifference to current events in the great public departments that is most discouraging, and I believe the relatively effective condition of the Reclamation Service is principally due to its newness and its relative unimportance among the other government bureaus.

If the activities of the government were spread over a wider area it would be with greatly increasing difficulty that a respectable average of efficiency could be maintained, unless the public itself became more alive to the vital interests at stake and enforced departmental reorganization.

In order to enable private enterprise to develop the water power where the sites have been withdrawn by the Interior Department, congress must pass legislation, and here again the voice of the state should be unmistakable. This is mainly a matter for expert advice as to the best means to secure full public control of the essentials and yet render development a reasonably attractive field for private enterprise.

There is no doubt in my mind that this problem can be solved if handled by experts and kept out of politics. It appears to me that any plan recommended to congress should include in any event that the power sites now withdrawn be granted to the state for entry and utilization, subject to public welfare rules, probably limiting the tenure, providing for approved methods of construction, utilization, operation and rate regulation. Prior to the opening of any of these sites there would seem to be necessity for action by a joint commission of federal and state officials in a complete examniation of each locality affected, and decision as to policies to be adopted in such matters as the continued reservation by the government of such sites as may be needed by the government or state.

EXTENSION OF TERRITORY AT PANAMA.

In a decree issued by the President of the Republic of Panama, under date of March 29, 1912, described as resolution No. 22, public proclamation was made that the Republic of Panama no longer exercises any authority in the area to be covered by Gatun Lake, which extends beyond the lines of the 10-mile strip, the same having passed into American control in accordance with the canal treaty.

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Beautifying the Highways

The continued agitation looking toward better and more efficient roads throughout the West is certainly deserving of the liberal and loyal support it is receiving. Western Montana, in which is located the famous Bitter Root Valley, noted for its McIntosh Red apples and Bing cherries, now comes to the front in a proposal to construct a road the whole length of this fertile valley with apple and cherry trees lining the project the entire distance.

This idea has been worked out in a self-supporting manner in several of the smaller countries of Europe although definite data is not at hand to tell whether these roads are located through an arid or semi-arid country requiring the use of water for maturing orchard crops. In these countries, however, the crops from the trees along the public highways are carefully gathered and the sale from them is found to be sufficient to maintain this beautiful custom.

Nothing adds to the stateliness or dignity of a great public highway more than an embroidered growth of some sort. Instances may be cited from recent eastern accomplishments along these lines. The New York State Department of Highways is to commence the systematic planting of trees along the improved highways under its jurisdiction. The Department has bought recently 150,000 red oak seedlings and 15,000 Carolina white birch trees for the purpose. In taking this step the New York officials are following the excellent example set by the Massachusetts State Highway Commission. This commission for a number of years has been planting trees along its improved roads. It has had its own nursery and its own forester. The tree planting has thus been done scientifically and systematically, and the results have been highly satisfactory.

In California it is gratifying to follow the broad ideals and high purposes held in view by those having in charge the spending of the $18,000,000 upon state highways voted some months back. Though such a sum is enormous in many respects, yet it is only a beginner in funds that should be set aside for this work. Indeed, the permanent and substantial plans now being prepared by this commission could never be consummated in completeness without additional millions.

Oregon, Washington and other western states are likewise voting fortunes in bonds for the furthering of good roads. Through it all, however, the aesthetical and indeed the practical results to be accomplished by embroidering these masterpieces of road structure wherever found expedient with trees, plants and other western activities are beyond human conception.

Someone has suggested that along with the trees, orchards and other vegetable matter proposed, why not embroider the roads with a power plant here and there. The wit who made this suggestion evidently is ignorant of the fact that there is more truth and sound argument in his suggestion than would appear at first sight. An old adage has indeed long ago informed us that "full many a truth is said in jest."

Power plant owners in many sections of the West

have long since felt the necessity of improving roads leading to their hydroelectric installations. Many of these constitute the most picturesque sights to be found in our Western Empire. Such accessibility to these great engineering triumphs makes the tourist of today, who is the investor on the morrow, more enthusiastic than ever in the future of the West.

In conclusion, then, let all interested in the welfare of the West and particularly those of us engaged in hydroelectric enterprises continue to boost for good roads, for increasing their efficiency and where possible for their beautification.

And along with this beautification, may western roads be embroidered where possible with apple trees, cherry trees, and a thousand western products never forgetting occasionally to connect up a side avenue to exhibit the greatest product of all—the western power plant.

Photography in Engineering Work

The courts bear record of the fact that much litigation has been effectively brought to a close by exhibitions of systematic and detailed photographs of construction work covering points at issue. Not alone in the courts, however, is the engineering photograph of value to the corporation. The careful filing of photographic records prove of incalculable service, especially in the matter of cost keeping; the daily progress of work can hardly be shown in such detail in any other manner. A series of photographic records exhibiting the manner of handling a new and delicate engineering feat tells its mute but realistic story beyond description in words.

So convinced of the efficacy of photography are many of the hydroelectric managers of the West, the subject of systematic office arrangements and methods for engineering photographic work is of timely and intense interest. In addition to the careful planning of proper rooms for efficient work, the manipulation or processes undergone in the production of a finished picture are strictly technical and in view of applications to engineering structure and reconnaisance, new ideas have been evolved distinguishing this separate art from the broader field of photography as generally practiced. The exposure, development, fixing, washing, drying, and retouching of the plate; the printing of the negative; the developing, fixing, washing, drying and mounting of the print—all these subjects must be carefully studied and mastered before engineering photography becomes a success.

On another page of this Journal will be found the beginning of a series of articles on photography in engineering work with special attention to office arrangements and methods. In succeeding issues will appear in consecutive order a discussion of the interesting details necessary in perfecting this new weapon of modern engineering equipment. The methods as given have been put into successful practice in one of the great hydroelectric companies of the West.

Mr. M. R. Lott, the author of this series of contributions, speaks with the force of technical training and experience. As an engineering graduate of Michigan with further investigation in the graduate school of applied science at Harvard, Mr Lott undertook this phase of engineering work in the Telluride Power Company at Provo, Utah, where he brought it to a successful and efficient stage of operation. That the executives of the Telluride Power Company realized the benefits and conveniences to be derived from the use of photography in engineering work can easily be gleaned from the methods advised by Mr. Lott, and the care shown in picking out the best methods in every detail indicates that good results are largely dependent upon attention to the minute factors that enter.

A Bad Law That Should Be Changed

The legislative enactment by the California State Legislature known as chapter 499 of the statutes of California, if it were not such a serious matter, for clear unadulterated consistency and engineering ingenuity, might legitimately be called a good joke. This act sets forth certain provisions regulating the placing, erection, use and maintenance of electric poles, wires and appliances. The statute also provides severe penalties for infringement.

One especially inconsistent and notoriously uncalled-for provision in this act is that relating to the size of the conductor at crossings of public highways. The statute provides that at crossings where wires are carrying a voltage higher than fifteen thousand, the cross-sectional area of the conductor shall equal at least twice that used in the line outside of such crossing. A strict interpretation of this would simply mean a stretch of wire of double cross-section long enough to cover the highway from one end to the other in its span would be sufficient. It is absurd to maintain that such a law adds one iota to public safety. Indeed, it is far more reasonable to believe that the added splicings may tend to weaken. It is easy to imagine that a cautious company in crossing two highways situated relatively near each other may decide to run the double area of cross-section the entire distance covering both highways. But even, then, though a far superior construction has been brought about, the law has been evidently infringed, for the company must again double the cross-section at the crossing or expose themselve to a $500 fine or imprisonment in a county jail not exceeding six months.

Still another confusion exists as to who has jurisdiction in the matter. The law would seem to indicate that the district attorney in each county should bring action in case of infringement. The new public service commission act is definite, however, in giving full authority to the railroad commission to investigate the cause of accidents and to take steps to prevent their recurrence. The closing clause of the public utilities act passed March 23, 1912, definitely repeals all acts or parts of acts inconsistent with the provisions of the utilities enactment.

A movement is on foot to change this law to meet reasonable and safe methods in the lines attempted in the present statute. The Journal will gladly welcome all suggestions that may be contributed. These will be tabulated and placed before the executives of the various interests at stake under the enactment in order bring about a unified action.

PERSONALS.

L. R. Wiley, a hydraulic engineer, is a recent arrival from Groveland.

G. L. Priest, representing Otis & Squires in their Portland office, was in San Francisco last week.

A. E. Wishon, of the San Joaquin Light & Power Corporation, is a recent arrival at San Francisco from Bakersfield.

H. N. Tracy, an engineer of Los Angeles, has arrived at San Francisco.

J. A. Lighthipe, an electrical engineer of Los Angeles, arrived at San Francisco from the north with Mrs. Lighthipe, during the week.

Wynn Meredith, of Sanderson & Porter's San Francisco office, is visiting Mexico on an investigation connected with a mining enterprise.

R. A. Ballinger, former Secretary of the Interior, gave an interesting address before the recent N. E. L. A. convention at Seattle.

L. H. Conklin, representing Brooks Bros., who own ten electric power plants, including the one at Warren, Pa., has arrived at San Francisco from Seattle.

A. H. Halloran, managing-editor of the Journal of Electricity, Power & Gas, is at Portland. Mr. Halloran is rejuvenating his youth, as Astoria was his former home.

Henry E. Warren, sales engineer of the Lombard Governor Company, is at San Francisco, making his headquarters with Pierson, Roeding & Co., the Pacific Coast agents.

Chas. F. Gilcrest, instructor in electrical engineering at the University of California, is engaged in special study in connection with the smelter smoke prevention problem.

F. S. Hunting, president of the Fort Wayne Electric Works, is a recent arrival at San Francisco and is the guest of G. I. Kinney, the company's Pacific Coast representative.

S. L. Shuffleton, who has general supervision of the operations of the Stone & Webster Engineering Corporation on the Pacific Coast, visited San Francisco during the past week.

A. B. Domonoshe, instructor in mechanical engineering at the University of California, has returned with a blushing bride, after a disappearance of two weeks on a honeymoon trip.

Thomas Whaling, manager of the incandescent lamp department of the Westinghouse Lamp Company, of Bloomfield, N. J., visited San Francisco after attending the N. E. L. A. convention at Seatte.

Frederick Herman Kreismann, the Mayor of St. Louis, who was in attendance at the National Electric Light Association, has arrived at San Francisco from Seattle, accompanied by George D. Rosenthal.

J. H. Wise, assistant general manager of the Pacific Gas & Electric Company, and Assistant Hydraulic Engineer Trowbridge will attend the annual meeting of the American Society of Civil Engineers at Seattle next week.

G. H. Atkin, manager of the Chicago office of the Electric Storage Battery Company of Philadelphia, and **H. B. Gay**, the Cleveland manager, are among the "post-convention" visitors at San Francisco. They will return to the East via Denver.

J. P. Jollyman, engineer of electric construction with the Pacific Gas & Electric Company, made an inspection tour of some of the principal electric power plants of the Pacific Northwest after attending the N. E. L. A. Convention at Seattle.

R. T. Guppy, formerly in charge of the Southern Pacific suburban electrification construction for Oakland, Berkeley and Alameda, has resigned to take complete charge of the electrification of the Southern Pacific lines out of Portland, Ore.

John Coffee Hayes, president of the Mt. Whitney Power & Electric Company, together with his brother **Harry Hayes**, head of the company's commercial department were recent San Francisco visitors on their return from the Seattle N. E. L. A. Convention.

Among the group of representatives of H. M. Byllesby & Co.'s interests who visited San Francisco after attending the N. E. L. A. annual meeting were: Messrs. **A. P. Jackson** of Mobile, Ala.; **H. H. Jones** of San Diego, **H. L. Jackman** of Eureka and **W. W. S. Butler** of Stockton.

E. O. Edgerton of the State Railroad Commission recently visited Southern California. At Los Angeles he heard the Holton Power Company's application for permission to issue $300,000 in bonds, and at Bakersfield the application of the Bakersfield Water Company to incur an indebtedness of $50,000.

S. Waldo Coleman, manager of the Coast Counties Gas & Electric Company, recently presided over a gathering of over two hundred employees of the company at a grand picnic in Laveaga park at Santa Cruz. Mayor Stone of Santa Cruz took occasion to publicly praise the company living up to their ideals—"The people be pleased."

John Crawford, Jr., manager of the Noble Electric Steel Company's electric iron smelter at Heroult, and **R. E. Frickey**, chief electrician at the plant, were recent San Francisco visitors. A second furnace is being constructed and the old furnace is being altered to permit of using 12-inch electrodes, increasing the capacity to 20 tons a day.

Harry M. Hope, assistant to F. N. Bushnell, engineering manager of the Stone & Webster Engineering Corporation, passed through San Francisco with Mrs. Hope during the past week, after attending the National Electric Light Con vention at Seattle. They will return to Boston via Del Monte, Los Angeles, Texas, and Keokuk, Iowa, where there is a big hydroelectric development.

Among the representatives of the Westinghouse Electric & Manufacturing Company who visited San Francisco and were entertained by the management of the San Francisco district office of the company after attending the N. E. L. A vonvention, were: **B. S. Manuel**, manager of the detail and supply division at Denver; **J. S. Tritle**, district manager of the company's Kansas City office; **J. A. Brett**, district manager at Cincinnati, O.; and **J. W. Busch**, connected with the company's Chicago office.

Hans von Schulthess, a consulting engineer of Zurich, Switzerland, was a recent San Francisco visitor. Mr. Schulthess is a son of a prominent Swiss banker who handles extensively American hydroelectric securities. An eighteen month study of American hydroelectric enterprises has been undertaken in order to post foreign houses regarding the stability of American securities of this nature. Mr. Schulthess attended the N. E. L. A. convention at Seattle, from which city he departed to Alaska.

E. R. Northmore, superintendent of the Los Angeles Gas & Electric Company, was a gracious host at a dinner at the Savoy Hotel in Seattle during the recent N. E. L. A. convention. The purpose of the dinner was to start an agitation looking toward bettering law No. 499 in the statutes of California relating to overhead crossings The following guests were present: **P. M. Downing**, and **A. R. Thompson**, of the Pacific Gas & Electric Company; **Robert Sibley**, editor Journal of Electricity, Power & Gas; **E. Sproule** and **E. L. Beal** of the Great Western Power Company; **L. N. Peart** of the San Joaquin Light & Power Company; and **F. G. Hamilton** of the Mt. Whitney Power & Electric Company.

Among the General Electric Company's heads of departments who visited San Francisco after the Electric Light Convention were the following: **C. W. Stone**, manager of the lighting department, of Schenectady; **E. E. Gilbert**, manager

of the steam turbine sales department; **F. G. Vaughan,** manager of the meter department; **M. O. Troy,** manager of the transformer department; **D. B. Rushmore,** engineer of the power and mining department; **J. R. Lovejoy,** third vice-president of the company, and **N. R. Birge** of the arc department; **E. F. Gehrkens,** engineer transformer department, Pittsfield; **H. L. Monroe,** manager railway department, Chicago; **A. D. Page,** manager, incandescent lamp sales department, and his assistant, **G. C. Osborn,** Harrison; **G. D. Rosenthal,** manager St. Louis office; **R. E. Moore,** assistant district manager, Philadelphia; and **S. L. Whitestone,** auditor, Schenectady, and **O. K. Baylor,** of New York.

ELECTRICAL CONTRACTORS' NOTES.

The following notation from the Chief Electrical Inspector is of timely interest to all electrical contractors:

To All Concerned:

Local Rule No. 48 refers only to concrete floors, or concrete floors covered with wooden flooring, and in damp and wet places.

Under conditions other than above, any approved flush receptacle will be passed favorably upon when installed in accordance with other local code rules.

To All Electrical Contractors:

When filing applications for inspection, the following blank spaces must be carefully filled in:

"Street and No.," "Owner," "Tenant," "Architect," "Occupied as," "Inspect," "Class of Building," "No. of Stores," together with the number of outlets, switches, plugs, lights, circuits and service.

If for motor installation, size, class, voltage and size of feeds must be filled in.

The above rules will be insisted upon, for the purpose of enabling this office to have proper records of all jobs, and any reports not properly made out will be returned for correction.

GEO. FISK,
Chief Inspector.

The Central Electric Company has been awarded building of seventeen flats on the corner of Jackson and Gough streets.

Bids are being taken for a number of good electric jobs, among which are the State Armory, amounting to $14,000; Geary-street car barns, $15,000; Holbrook job, Sutter and Grant avenue, $15,000; Boston Amusement Company, theatre, $15,000; Wilson job, Mason and Lutheno place, $7,000.

The city inspectors throughout the State are going to attend the California State Association of Electrical Contractors' meeting at San Jose in a body.

John Rindler and W. S. Hanbridge, directors from California to the National Association of Electrical Contractors, and E. F. Burkhard, Louis Luy and W. A. McNally will leave in the early part of July to attend the convention at Denver. They have promised to bring back some of the Eastern delegates to attend the State convention in San Jose.

Oregon's delegates will be in San Jose according to a letter from Secretary Tomlinson of Portland Local.

Visitors' tickets for the State Contractors' Convention are now out and can be obtained from any of the local contractors. The price is $5 for a book of six tickets. Coupons will admit holder to go on three excursions, attend theatre party, annual dinner and Electric Trades Picnic.

S. A. Pacheco, manager of Luna Park, was in town Tuesday and has turned Luna Park, with the ball grounds, over to the Contractors for July 27th. Messrs. Aimes, Cohn and Faser promise the electrical people a treat that they will remember for a long time. All kinds of games for young and old, plenty to eat and drink, music for those who dance, baseball for the fans, and a good time for all.

An item in the Daily Commercial News refers to the increased price of electrical material and in a slurring manner refers to preparations of the electrical people getting ready to boost prices. The only foundation for such a report is on account of the fact that the new Code wire is just being placed on the market and it means that in the future a higher grade of insulation will protect the users of electricity from fire hazards. The increased cost is not worth talking about. No doubt the writer of the above article has been in the hands of some contractor who is afraid that he will make too much money and has recommended the use of cheaper material to close a deal.

Frank Somers of San Jose was in town Monday.

A number of the local contractors have started a luncheon club in the main dining room of Campi's Restaurant, which meets daily. Many local problems will be settled over the board, but at present there is a three-cornered deadlock of national repute—Roosevelt, Taft, Clark.

MEETING NOTICE.

The American Institute of Electrical Engineers meets in annual convention at Boston, June 24-28. A most interesting program has been prepared. The social features which begin with a reception and dance at the grand ball room of the Hotel Somerset, on Monday evening, and end with the institute banquet on Thursday evening promise to be unusually brilliant. The papers are more numerous than ever and will constitute food for serious reflection for the engineering fraternity for many months.

ELECTRICAL LEAGUE OUTING IN LOS ANGELES.

The following are details of the Electrical League outing to be held at Balboa, June 29, 1912:

Special trains will leave on Los Angeles street in the rear of the Pacific Electric building, at 9 a. m. going, and will leave Balboa at 5 p. m. returning. Tickets will be 75 cents for the round trip; children from 5 to 12, 40 cents; under 5, free. The tickets will be good on any Balboa car during the entire day and the ticket holders are not restricted to the special trains. There will be many new and novel sporting events for which many prizes will be given and in which all are welcome to participate. The outing is for all in the electrical business who desire to attend and their friends are all welcome also and is not exclusive in any way.

All electrical houses in Southern California are expected to close on this day. Coffee will be served on the grounds free.

BOOK REVIEW.

Toll Telephone Practice. By J. Bernhard Thiess, B. S., LL. B., and Guy A. Joy, B. E., with an introductory chapter by Frank F. Fowle, S. B.; size 6½x9½ in.; 418 pages; 273 illustrations; cloth binding. Published by D. Van Nostrand Company of New York and for sale by the Technical Book Shop, Rialto Bldg., San Francisco. Price $3.50.

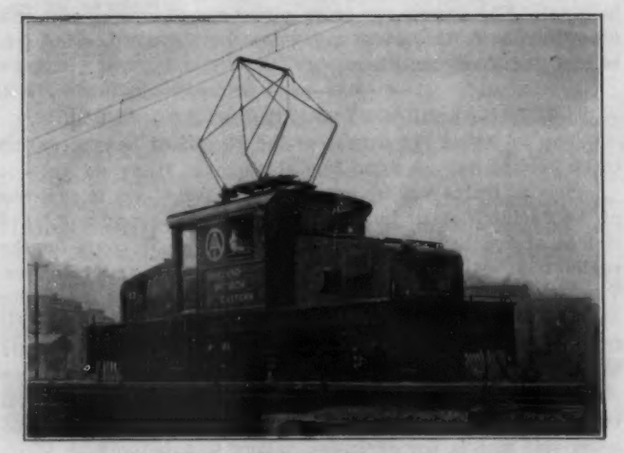
The rapid rise of the telephone art during the past two decades has now made it impossible to completely discuss all phases of the art in one comprehensive volume. Common usage among telephone men has led to the general classification of telephone service under four headings—local, suburban, toll, and long distance. The last three are broadly classed under the general heading of toll telephone service and hence these constitute the subject matter of the book under discussion. The book opens with an introduction by Frank P. Fowle, the well known telephone expert. In this chapter the development of the telephone art is interestingly treated from an historical point of view. Twenty-five chapters next appear treating of the principal subjects connected with toll practice. The various switchboard systems are described. Simplex and composite systems with line construction problems, including methods of testing, are systematically and logically treated. The chapter on phantom lines, though brief is nevertheless well treated and ably affords the reader the fundamental considerations entering this important branch of telephony. The book will prove a needed addition to those engaged in telephone engineering or in the construction of toll telephone equipment and installation.

INDUSTRIAL

A 600-1200 VOLT DIRECT CURRENT FREIGHT LOCOMOTIVE.

A 47-ton standard gauge electric locomotive has recently been added to the rolling stock of the Oakland, Antioch & Eastern Railway, for handling its freight service. This system when completed will make a network of lines totalling about 156 miles, extending out from Oakland, California.

Locomotives are productive of a considerable revenue to electric roads; and also, as in this case, no complications necessarily arise as to maintenance, since the locomotive control parts and car control parts are interchangeable. This considerably reduces the number of kinds of spare parts to be carried in stock; and thus results in simple, low and efficient maintenance.



600-1200 Volt D.C. Freight Locomotive.

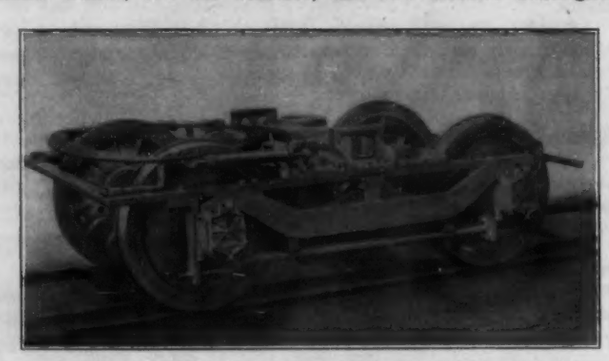
The mechanical parts were furnished by the Baldwin Locomotive Works, Philadelphia, while the electric equipment was furnished and installed by the Westinghouse Electric & Manufacturing Company, East Pittsburg, Pa. The locomotive is of the well known double truck type with steeple cab. It is arranged for double end operation and can traverse curves of 50 feet radius when hauling a trailing load.

The trucks are of the equalized pedestal type, with one piece forged iron frames and rigid cast steel transoms. The pedestals and pedestal braces are of forged iron, and the pedestal binders of malleable iron. The transom gussets are of cast steel. They have ample bearings on the frame and transom, and act as brake lever guides and brake shoe hanger supports. The brakes are inside hung and are applied through a radial beam, which is supported on the inner end of the truck frame. The wheels have cast iron plate centers with steel tires which are shrunk and bolted on.

The locomotive frame is of steel, built up, and is composed of commercial shapes as far as possible. The longitudinal sills are four in number, and they consist of 12-inch channels. Between the middle and outer channels, on each side is worked a strong arrangement of diagonal braces composed of 6-inch channels. The end bumpers are of steel plate ⅞ in. thick and 20¾ in. deep. The draw castings, which are of steel, are riveted in place between the center sills and back of the bumpers, and are arranged to take long shank radial couplers of the M. C. B. type. The bolster plates over the trucks are 66 in. wide and are substantially braced to provide the necessary stiffness. The bolts, which secure the center pins to the plates, also pass through the flanges of the middle frame sills. The various parts composing the frame proper are held together by ⅞ in. rivets.

The cab is of steel and is centrally located. The ends of the locomotive are covered by hoods, under which are placed the switch groups, reversers, resistors, dynamotor compressor and other equipment. The cab is entered through side doors and has large end windows, so that unobstructed views can be obtained above the hoods. Steps and handholds are arranged in accordance with the requirements of the Interstate Commerce Commission. The width of the cab and hoods is less than that of the frame, and there is room for a continuous running board from end to end on each side if the locomotive.

This locomotive is fitted with an iron pilot at each end, air sanders with spouts to all the wheels, combined air and hand brakes, two air whistles, and two electric headlights.



Baldwin Type Locomotive Truck.

A standard locomotive bell with pneumatic bell ringer is mounted over one of the hoods. The principal dimensions are as follows:

Truck wheel base, 7 ft. 4 in.
Total wheel base, 25 ft.
Distance between truck centers, 17 ft. 8 in.
Driving wheels, outside diameter, 42 in.
Driving wheels, center diameter, 37 in.
Journals, American Electric Railway Association, standard, 5 in. x 9 in.
Width over all, 10 ft.
Height to top of cab, 12 ft.
Length between coupler knuckles, 35 ft.
Total weight, 98,100 pounds.
Estimated weight of mechanical equipment, 57,000 lbs.

For propulsion, this locomotive is supplied with four Westinghouse No. 308-B-6, 120 h.p., 600-1200 volt commutating pole railway motors with a gear ratio of 19:54. The driving wheels are 42 inches in diameter. Box type of frame construction is used, the frame being cast in one piece of steel with large openings at each end for bearing housings and taking out the armature endwise.

This motor is of the slow speed type and particularly adapted to freight haulage, for with a motor of this type heavy loads can be handled with but a comparative small increase in power consumption for a system.

Control of the HL unit switch type is used. The motors are in series and parallel with each other in conjunction with the necessary resistance to produce smooth acceleration on either 600 or 1200 volts operation. A hand-operated change-over switch, shown in Fig. 2, is used to change the main circuit over from 600 to 1200 volts or vice versa. On 1200 volts, the motors are operated four in series, and four in series parallel. On 600 volts, they are connected for operation with four in series parallel, and four in parallel. A dynamotor furnishes low voltage for supplying the lighting and control circuits.

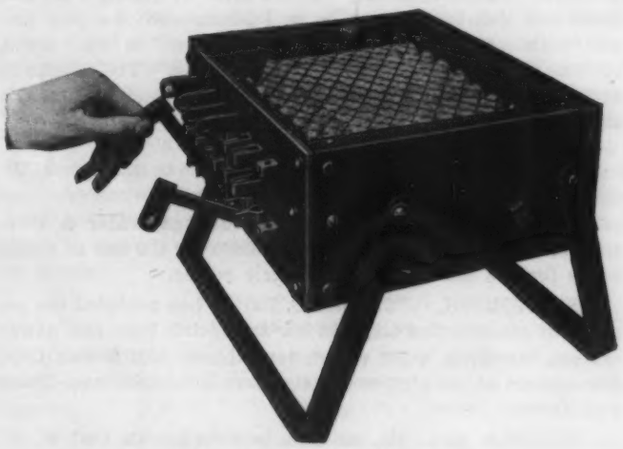
The air brake equipment is of the Westinghouse "EL" type, and includes all apparatus necessary for the operation of the locomotive and train brakes. Air for the brake and

control systems is supplied by two D-3-EG dynamotor driven compressors, each having a delivery capacity of approximately 25 cu. ft. of free air per minute.

The performance of this locomotive is such that it will exert a tractive effort of 16,700 lb. at approximately 10:65 m.p.h. and, with a clean dry rail, a maximum tractive effort of 23,500 lb.

NEW PORTABLE METER TESTING LOAD RHEOSTATS.

Because of legislative rulings in many States, and because of the fact that meter testing at regular intervals is regarded as good business by progressive central stations, there has developed a need for light weight portable load rheostats for providing artificial load on the consumer's premises. Meter testing on the premises of the consumer is more convincing than tests made in the laboratory of the central station.



Improved Portable Rheostat.

The Cutler-Hammer Manufacturing Co. of Milwaukee have for some time been supplying portable load rheostats to a number of central stations and have now placed a complete line of bench type and floor type rheostats on the market. These load rheostats combine large capacity with convenient dimensions. They are suitable for both direct current and alternating current service, and for continuous duty. The line includes styles for service on 115 volts, 230 volts and 600 volt systems, as well as combination 115-230 volt rheostats. They are adapted for use with meters having the potential circuit across the outer wires, and also for those having the potential circuit across the neutral and one outer wire.

The resistance wire is wound on a light fireproof base and is covered with a special cement to prevent shifting or mechanical injury. The terminals are located so that there is no danger of making a mistake in connecting. The switches, mounted on asbestos lumber, are of the single pole type in which the blade is guided into the clip. For carrying, the feet are folded over the frame and held by a latch. The weight of the bench type shown in the above illustration is only 13 pounds.

ELECTRICAL EQUIPMENT FOR THE NEW YORK TRIBUNE.

The Sprague Electric Works of General Electric Company, New York, has been awarded the contract for furnishing and installing a complete electrical equipment in the new plant of the New York Tribune.

The apparatus will consist of the following:

One 200 kw., 125 volt, engine type generator; two 60 h.p. double motor equipments with full automatic push button control systems for operating Duplex newspaper presses; two electric hoists for handling paper rolls; various individual motors for operating stereotyping machinery. The present switchboard is to be remodelled with new instruments, switches, etc. Sprague conduit will also be used in the installation.

Thirty-two linotype machines in the composing department are already driven by Sprague electric motors and with the new additions to be made the plant will be a modern one in every respect. The Sprague Electric Works has long made a specialty of this class of installation and the Tribune outfit will be a striking example of what electricity is doing for the modern newspaper.

TRADE NOTES.

Fairbanks, Morse & Company have removed to their large new quarters at 649-651 Mission street.

The Erie Railroad Company has ordered from the Westinghouse Electric & Manufacturing Company two quadruple equipments of No. 132 Z motors and HB control.

The Westinghouse Electric & Manufacturing Company has received an order from the Springfield Street Railway Company, Springfield, Mass., for one double equipment of No. 305 A-2 motors and HL control, and one quadruple equipment of No. 323 motors and HL control.

Mr. S. G. Meek, who was appointed assistant general manager of the electrical department of the H. W. Johns-Manville Company, on May 15th, has been associated with the company as special representative in the electrical department for a period of over fifteen years, and has the honor of being one of the company's most successful salesmen.

The Holabird-Reynolds Company of San Francisco is being congratulated upon securing the coast agency of the Hughes Electric Manufacturing Company of Chicago, dealers in electric ranges. The attractive exhibit of the Hurley Machine Company at the Seattle Convention of the N. E. L. A. will be put on display in the San Francisco office of the Holabird-Reynolds Company.

An office has been opened at 817 Shreve Building by F. Harvey Searight, representing J. M. Main, Pacific Coast sales agent for the Skinner Engine Company, Erie, Pa.; Wilbain Bros. Boiler Manufacturing Company, Minneapolis; National Steam Pump Company, Upper Sandusky, O., and Union Iron Works (boilers), Erie, Pa.

The Pacific States Electric Company have taken the Pacific Coast agency for the steel towers manufactured by Hubbard & Company of Pittsburg. They have also taken the agency for the Union Metal Manufacturing Company of Canton, Ohio, on rolled steel ornamental street lighting posts; also the agency for Dodge & Zuill, of Syracuse, N. Y., manufacturers of the Easy Washer, a moderate priced electrically driven machine.

Reese Llewelyn, of the Llewelyn Iron Works of Los Angeles, is in San Francisco on business connected with a large contract for boilers awarded by the General Construction Company. It is understood that his firm will supply thirty-three boilers for the eleven oil-pumping stations to be installed along the new pipe line that is to be constructed for handling the output of the wells developed by the Esperanza Oil Company, and now controlled by the General Petroleum Company. David Dorward of San Francisco is the engineer for the oil interests.

NEW CATALOGUES.

The General Electric Company recently issued Bulletin No. 4910 which is devoted to Oil Break Switches for 600, 4500 and 7500 alternating current circuits. This is known as the Type F, Form K-5 switch, and is a switch of moderate rupturing capacity, liberally designed, conservatively rated, and simple in construction and operation. The bulletin enters into the details of construction, and contains dimension and connection diagrams.

NEWS NOTES

INCORPORATIONS.

SAN LUIS OBISPO, CAL.—San Miguel Interurban Telephone Company; $5000, subscribed, $4000; by T. H. Rouquet, W. M. Sutton, W. A. Wilmer, H. H. Durham and L. Van Horn.

CITY OF MEXICO, MEX.—Mexican Midland Light & Power Company has recently been incorporated in Canada under the laws of the Province of Ontario to work concessions granted to Compania Hydro-Electricia Mexicano, S. A.

ASTORIA, ORE.—Artcles of incorporation of the Elk Creek Light & Power Company have been filed by Orrin Kellogg, Otto J. Kraemer and Lester W. Humphreys, with a capital stock of $5000 and principal place of business at Elk Creek.

ILLUMINATION.

ALBUQUERQUE, N. M.—Work on the new lighting system on Central avenue has been started.

SUISUN, CAL.—Bids for the sale of an electric power franchise will be received up to August 6.

SANTA ANA, CAL.—Henry Leukfield has asked the city trustees of Huntington Beach for a franchise to operate a gas plant.

SANTA PAULA, CAL.—The Sulphur Mountain Springs Company will install an electric light plant to furnish lights for cottages and tents.

SANTA MARIA, CAL.—The Lompoc Gas & Electric Company has applied for permission to purchase the plant of the Electric Light & Power Company for $50,000.

SAN JOSE, CAL.—Preliminary work has been started on the large substation for the Sierra and San Francisco Power Company, at Alviso, which will cost in the neighborhood of $25,000.

PHOENIX, ARIZ.—The power plant is owned by the city and it has been generating its own electricity, but now intends to put in transformers and get electricity from the government.

GARDNERVILLE, NEV.—The Douglas Milling & Power Company has made application for a franchise along certain public roads in Douglas County. The hearing of the petition will be held July 8th.

SAN FRANCISCO, CAL.—The only bid received by the Supervisors for lighting the streets, public buildings and places was presented by the Pacific Gas & Electric Company. The prices asked are the same as are now in effect for lighting, while a slight reduction is made on the electric power furnished the municipality. The company submitted five bids covering all classes of lighting and power service. The bid was referred to the Lighting and Rates Committee for consideration.

SAN FRANCISCO, CAL.—The reduction agreed on by the lighting rates committee of the Supervisors are: The price of gas, now 80c, is to be cut to 75c per 1000 cubic feet. The electric light rates, which are graded in accordance with the amount of current consumed, are trimmed so as to bring about an average reduction of 20 per cent. It is stated that approximately 4,000,000,000 cubic feet of gas may be used in this city during the coming fiscal year, although the consumption as reported by the gas company indicates that this estimate is somewhat too high, and on this basis the saving to consumers will be about $200,000 for the year. The saving on electric light rates is estimated at $200,000 or more for the year. There is no reduction on arc lights, but on other lights the rate is reduced so that the maximum is reduced from 9c to 8c per kw. hour.

LOS ANGELES, CAL.—The Southern Counties Gas Company has petitioned the State Railroad Commission for authority to issue bonds to the amount of $443,000. They are the unsold portion of an issue of $1,000,000 dated April 1, 1911. The bonds carry 6 per cent and are to be sold at a price not less than 90. The corporation operates gas plants and distributing centers at Glendora, Azusa, Covina, Monrovia, Sierra Madre, Arcadia, South Santa Anita, El Monte, Whittier, Fullerton, Anaheim, Orange and Santa Ana. It proposes to extend its field of operations and purchase from the Southern California Edison Company for the price of $400,000 the gas plant and distributing system in Pomona and the pipe line and distributing systems in and adjacent to the towns of Claremont, Lordsburg and San Dimas. The company seeks permission to use the proceeds of its bond sale for the purchase of these properties.

TRANSMISSION.

SANTA BARBARA, CAL.—The Coalinga Water & Electric Company has applied for a franchise for the use of public roads for the distribution of electric power.

SNOHOMISH, ORE.—Jack S. Burton has accepted the position of construction engineer for an electric light and power system, including water power development, for Sultan City. The owners of the proposed system are I. C. Anderson, Frank and Herman Friese.

EUREKA, CAL.—It has just become known that H. M. Byllesby of the Byllesby Company of Chicago, and one of the principal owners of the Western States Gas & Electric Company, is backing the Klamath River power project, which is destined to make Trinidad Bay an important harbor. A big electric smelter is to be erected at Trinidad and ores brought to that place from all parts of the globe will be smelted electrically. Preparations are now being made for the installation of the power station at Ishi Falls on the Klamath River.

SAN FRANCISCO, CAL.—Wires and conduits will have to be laid under five miles of streets by the Pacific Gas & Electric and City Electric Companies before January 1, 1914, if the ordinance proposed last week by the Supervisors' electricity committee is adopted by the board. The United Railroads will also be included in the ordinance, but have succeeded in obtaining a two weeks' continuance pending the return of General Manager Black. The section affecting the United Railroads will order all high-power feed wires placed underground in the new district specified. Overhead trolley wires and their appurtenances will be allowed to remain.

DAVIS, CAL.—The Pacific Gas & Electric Company is building an addition to its big new substation in this town to house two machines that will handle 4000 volts single phase electricity for the Southern Pacific Company's block signal system east and west of here. The railroad company has been using batteries to operate its block signals and the change to electricity from the new source is expected to work a saving and give better results. Poles are being set along the railroad to carry the "juice." The electric company is also building a power line east from Woodland to the substation that will supply power to the Vallejo Northern Railroad, the line being on the railroad's right of way.

LOS ANGELES, CAL.—E. F. Scattergood, chief electrical engineer of the aqueduct power bureau, submitted to the public service commission a report showing that the estimates

of cost for a complete and appropriate electrical distributing system for the city, which estimates were used as a basis for discussions at a recent meeting of the board, indicate that such a system as contemplated would cost the city $5,632,000. This system provides for all street lights, commercial lights and power within the present city limits as estimated for the year 1913. Scattergood's report contemplates an underground system, approximately one-third greater than the present underground area, and an overhead system for both street lights and commercial lights and power purposes throughout the remainder of the city.

MARSHFIELD, ORE.—What it is believed will be one of the greatest water powers in Oregon is to be developed in Coos County by Oregon capital at the cost of about $1,000,000. The plan is to build an enormous electric plant, the electricity to be generated by water power and to supply all of the towns of the county and rural and logging districts. The matter has been under consideration for some time and the men interested before leaving this city announced that they were gong ahead with the big project at once. According to the laws of the state they must have at least 12,500 horsepower developed by July 5, 1916, in order to hold the water right. The river has a drop of 1050 feet in one mile and by taking the water through the tunnel it will have a drop of 1600 feet. By increasing the height of the dam the power developed could be increased to 50,000 horsepower. The big drop of the water and the nature of the rock through which the tunneling must be makes the water right one of the easiest in the state to develop.

TRANSPORTATION.

RIVERSIDE, CAL.—Preliminary work on an electric line to connect Colton with Riverside by interurban trolley has begun.

EL PASO, TEX.—The contract offered by the local committee, providing for right of way and bonus of $15,000 of the El Paso-Ysleta interurban line has been accepted.

EUGENE, ORE.—A delegation of citizens from Pleasant Hill was in Eugene recently to urge upon the Oregon Electric officials that the road should build a line to Pleasant Hill. The officials seemed favorably disposed.

TUCSON, ARIZ.—Authorization for the expenditure of $90,000 in extensions and improvements of public utilities service, including street car lines, has been received by the Tucson Gas, Electric Light & Power Company.

YAKIMA CITY, WASH.—A movement has been set on foot by the commercial club of this city to have a bond issue voted for $3500, the money to be used as a bonus to build an electric line between this city and North Yakima, four miles distant.

PHOENIX, ARIZ.—Negotiations for the transfer of the Phoenix Electric Railroad Company system and franchise to the Salt River Valley Electric Railroad Company, which has been promoting the "White Line," are under way in Los Angeles.

HANKOW, CHINA.—A contract has been concluded between the government of China and E. K. Howe, representative of the Robert Dollar Company of Shanghai, for the construction of the new Hankow electric lines, including paving. The cost is estimated at $15,000,000 to $20,000,000.

SPOKANE, WASH.—It is reported that the Spokane & Inland, constituting the Hill eelctric system in Washington, contemplates rushing an extension from Colfax, to Pullman, electrifying the Northern Pacific from Pullman to Genesee, Idaho, and the construction of a line from Genesee to Lewiston. The sum of $1,500,000 will be requested for the work.

PORTLAND, ORE.—The Clackamas Improvement Association has made the suggestion to the Hill railroad interests that the railroad people construct an interurban line from Portland by way of the Reed college grounds up the valley to and through the Clackamas district, then on through a number of fine towns to the present line of the Southern Pacific Railway, and the watershed of the Cascade range.

STOCKTON, CAL.—The Tidewater & Southern Railroad expects to have its line completed between this city and Modesto by July 10, and will run an excursion from here. The trip will be made in borrowed coaches. The company expects to handle all of this year's grain crop along its line. Over 600 tons of steel rails are en route to this city for the company. The Western Pacific road has already brought five carloads of ties. The road is at present completed from Modesto to the Stanislaus River. The new material is believed to be sufficient to finish the road.

SAN FRANCISCO, CAL.—The public utilities committee of the Supervisors is undecided on the question of awarding the contract for the construction of the car house for the municipal railroad to F. Rolandi, the lowest bidder. Supervisor Murphy thinks that 10 per cent of the entire bond issue for the city railway is too much to spend for a car barn. Rolandi's bid is $210,000 for the least expensive of the three specified forms of building and $230,000 for the building with all proposed features. The latter offer is the one which is to be accepted if the contract is awarded.

SACRAMENTO, CAL.—The Railroad Commission has granted permission to the Sacramento & Woodland Railroad to construct its track at grade across the Southern Pacific rails at Mikon, Yolo County. It is directed in the order granting the application that the Sacramento & Woodland Railroad shall install at its own expense a first class standard, electric interlocking device with signals and equipment to make for the greatest degree of safety. The expense of maintaining and operating the interlocking device, after its installation, is to be divided, according to the terms of the order, between the Sacramento and Woodland and Southern Pacific Company.

SACRAMENTO, CAL.—The Oakland & Antioch Railroad Company has filed an application for a franchise from the M street bridge on M to Third and on Third to I streets, with the City Trustees as a substitute for three applications previously filed. The term of the franchise asked is 49 years. The railroad proposes to build a double track along the route and a single track on the M street bridge for the purpose of carrying freight, mail, express and passengers. Work on the road is to be commenced four months after the franchise is granted and finished within a year. It is provided that the railroad must deliver the cars of any other interurban or steam railroad to any warehouse or wharf along its route and may charge a fee for such switching. The city is empowered to use any or all of the track for a belt line on condition that it pay a just share of the cost of construction and maintenance. No cars are to be permitted to stand on the streets. The road is to pay 5 per cent of its gross receipts to the city after the first five years.

TELEPHONE AND TELEGRAPH.

BLAINE, WASH.—It is probable that the Farmers' Mutual Telephone Company will make numerous improvements, including a $7500 central building, here.

SAN FRANCISCO, CAL.—Twin wireless stations to communicate direct with London will be built along the New Jersey coast, within a year, according to an announcement made today by the Marconi Wireless Telegraph Company of America. Options have been obtained on similar sites at San Francisco and Honolulu.

SAN FRANCISCO, CAL.—Before Railroad Commissioners Eshleman and Thelan Saturday, Hunt Chipley of New York, a special attorney for the Pacific Telephone & Telegraph Company, made a vigorous plea that the suit of the Tehama and Glenn counties telephone companies against his client for an interchange of switches under the provisions of the

public utilities act be dismissed. Chipley argued that no public convenience or necessity would be subserved by such a step, for the Pacific company was giving those sections of the State, as well as other parts of California, a modern, quick telephone service. The Commission denied the plea.

SAN FRANCISCO, CAL.—The ordinance presented by the Telephone and Rates Committee recommends the following changes from the rates now being collected: The complement of exchange switches included with the $5 per month rate is increased from 75 to 80 switches; the $7.50 per month rate is increased from 175 to 185 switches; the $9.15 per month rate is increased from 240 to 250 switches; the $12.47 rate per month is increased from 380 to 390 switches; the $15 per month rate is increased from 530 to 540 switches; the $17.48 per month rate is increased from 750 to 780 switches; the $19.57 per month rate is increased from 1080 to 1100 switches.

PHOENIX, ARIZ.—In all probability the Overland company will be taken over by the Mountain States Telephone Company, which last week acquired the Arizona Telephone Company. The negotiations for the purchase of the Overland have been going on for a couple of weeks but nothing regarding them was disclosed until last week when it was learned that an agreement had been reached between a representative of the Mountains States company and a committee of the stockholders of the Overland. The company will accept a sum equal to 75c on the dollar for the bonds and 15c on the dollar for the stock of the Overland. This will bring the purchase price of the Overland to something less than $425,000. This proposition was accepted by Mr. Fennimore.

OAKLAND, CAL.—The City Council listened to Ernest Phillips, representing the League of Justice, give arguments for the reduction of telephone rates. Phillips read a communication from the Pacific Telephone & Telegraph Company asking that the present rates be unchanged. Maynard S. Bailey, manager of the Oakland branch, filed a statement from the company showing that the gross exchange revenue from the Oakland plant for 1911 was $682,725.39 and that this amount was upon an investment of $3,163,000, showing an actual return on the investment in Oakland of only 2½ per cent after payment of operation expenses, depreciation, etc. Stock in the amount of $32,000,000 preferred and $18,000,000 common has been issued, it was claimed for the company, representing an actual investment upon the entire plant from Canada to Mexico. The company has been paying 6 per cent dividends on preferred stock and nothing on common stock. It was pointed out that Oakland was enjoying the lowest rates for the same number of subscribers on one exchange of any city in which the company operated a plant. It was hinted by officials of the company, in the event of the Council fixing a lower rate than now charged, the matter would be taken to the courts.

WATERWORKS.

LOS ANGELES, CAL.—The Utilities Company has applied for permission to issue $10,000,000 bonds. The company's headquarters are in Riverside, and it proposes to supply water for a tract of 30,000 acres in that county.

ASTORIA, ORE.—The water commission at Seaside will begin work immediately on the construction of a new water system for that town, and will make improvements that will entail the expenditure of approximately $15,000 this summer.

MILL VALLEY, CAL.—A general election of the Marin municipal water district will be held in the county of Marin June 27th, for the incorporation and organization and management of a municipal water district and to provide for the acquisition and construction of said district of water works.

PORTLAND, ORE.—Work will be started immediately on the big pipe line which will connect the new $3,000,000 gas plant of the Portland Gas & Coke Company at Linnton with the distributing tank at the foot of Glisan street according to an announcement made by Guy Talbot, president of the company. The high pressure main will be six miles long and 16 inches in diameter. The cost is estimated at $100,000. The company will expend about $600,000 in addition during the next six months on the first unit of the gas plant at Linnton.

RAYMOND, WASH.—City Engineer Henry has reported plans and estimates for two water tanks to be used as an auxiliary to the salt water fire protection system. The plans submitted call for two tanks with a combined capacity of 100,000 gallons. Tanks to be 22 feet square and 14 feet deep and their estimated cost is $300 each. With the necessary pipe connections, with salt water mains, etc. The total cost is estimated at about $2600. The Council instructed the city clerk to advertise for bids for the construction of the tanks.

OAKLAND, CAL.—That the present water rate, without the injunctional 15 per cent, gives the Spring Valley Water Company a fair return on its investment and should be made the official rate for the ensuing year is the decision of the majority of the committee of the whole of the Supervisors. The committee's action was largely influenced by the report of the water company, which shows that its profits last year amounted to $1,300,000, which is equivalent to 6 per cent. The committee takes the position that this statement of the company justifies the rate now in existence. It also shows that the profits of the company are steadily increasing, so that the return for the ensuing year on this rate would doubtless amount to $1,500,000 and amply justify its fairness if tested in court.

SACRAMENTO, CAL.—The proposition of the Sacramento-Sierra Water & Power Company to furnish the city with a clear mountain water supply is said to admit of the possibility of developing electric power for municipal use. The Sacramento-Sierra Company plans to get its supply of water from the Volcano reservoir between the watersheds of the Cosumnes and Mokelumne Rivers in Amador County. It is proposed to pipe it to Sacramento, where it will be delivered at a pressure of 85 pounds at the rate of two million gallons a day. The company is willing to enter into a 50-year contract with the city, the latter reserving the privilege of purchasing at any time for $2,500,000. The officers of the water company are: Edward Records, president, San Francisco; Dr. Dudley Smith, vice-president; John Muldoon, treasurer, Berkeley; Chas. L. Barsotti, secretary, San Anselmo; C. J. Lancaster, Alameda; E. D. Boydston, superintendent, Volcano; George P. Robinson, manager, Sacramento.

SAN FRANCISCO, CAL.—The Southern California Utilities Company has applied to the Railroad Commission for permission to issue bonds in the sum of $10,000,000. The company has its headquarters in Riverside and proposes to sell water for purposes of irrigation. The application states specifically that it is intended to supply water for a tract of 30,000 acres in Riverside County. The company states that it has options on the properties of the Ramona Power & Irrigation Company, the Lake Hemet Water Company, the Fairview Land & Water Company, the Hemet Land Company and the Hemet Town Water Company. From the proceeds of the bond sale, according to its petition, the company proposes to expend $4,700,000 in new construction in developing the Ramona Power & Irrigation Company. A portion of the balance will be utilized in the purchase of the other companies. The project will be financed through the Universal Construction & Investment Company.